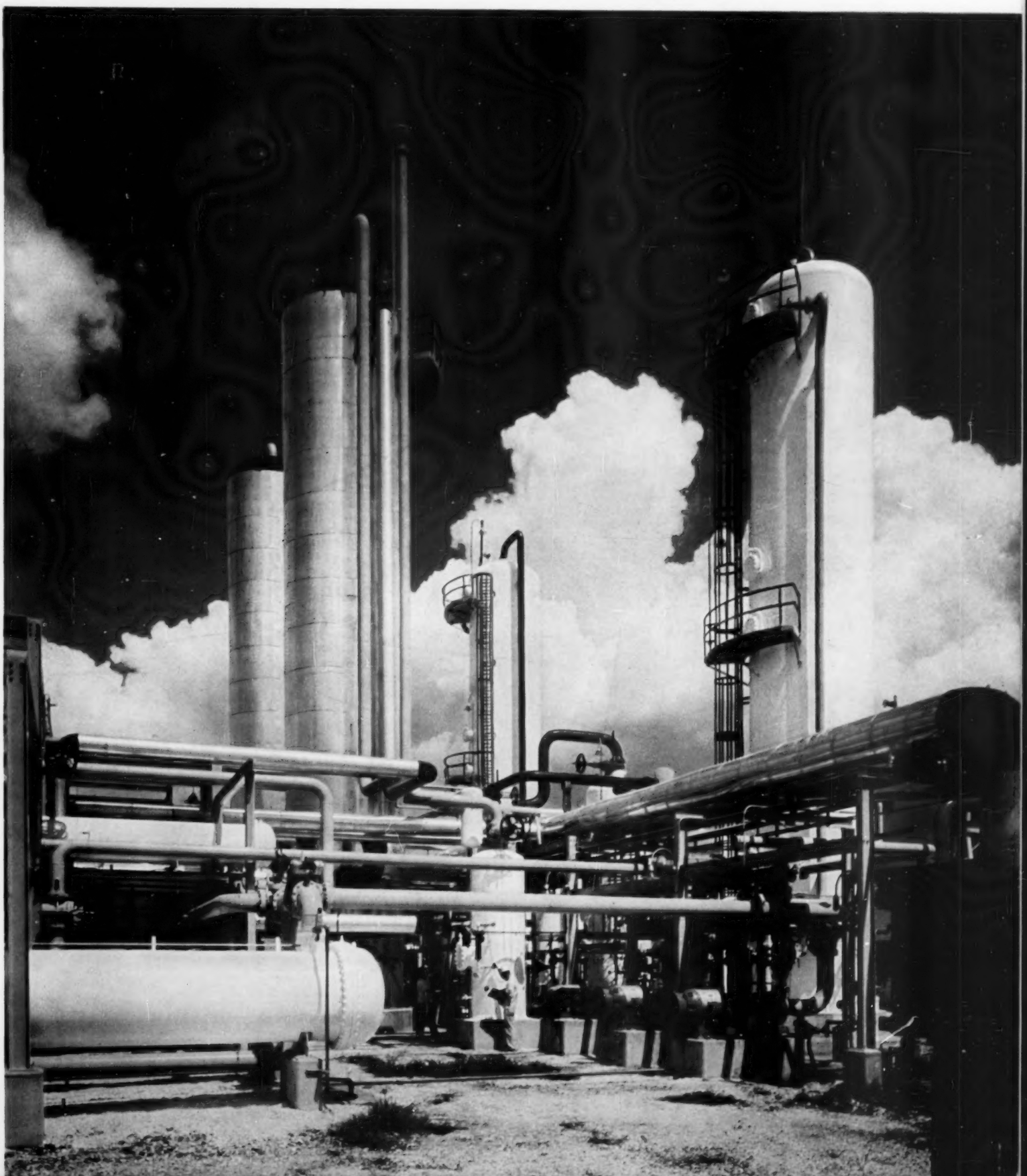
DECEMBER 1954

World Petroleum

FIVE DOLLARS PER YEAR • ONE DOLLAR PER COPY



follow the operators

who **AVOID**

PRODUCTION HEADACHES

and you'll find that many of them use—

LANE-WELLS COMPANY

Engineered

PACKERS

The reasons are BUILT-IN!

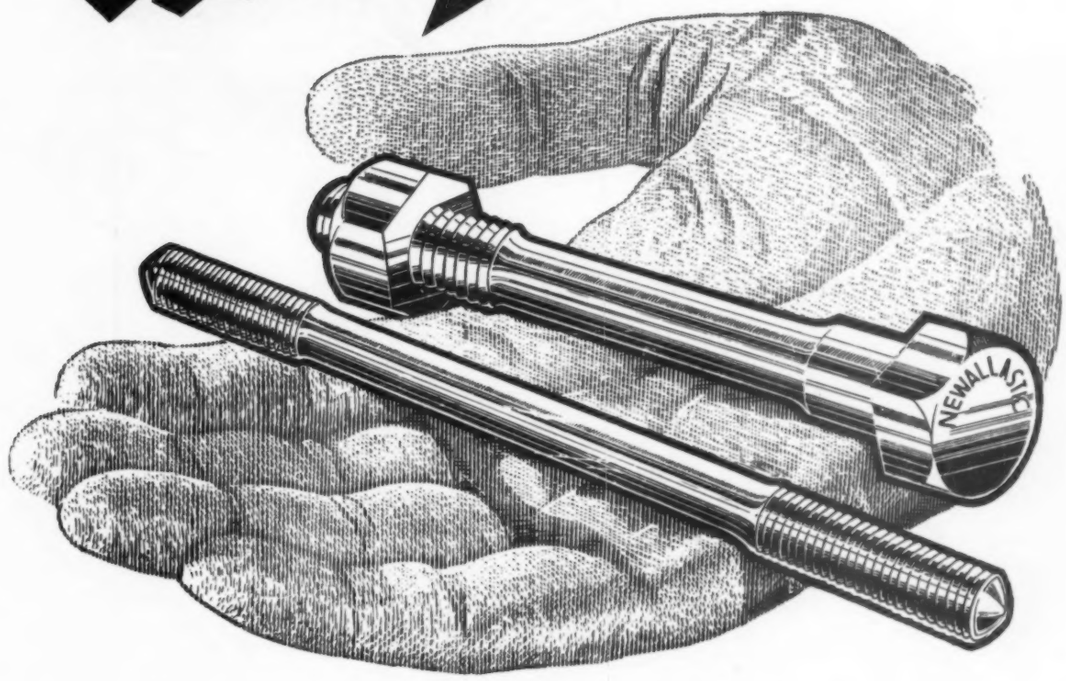
Write for complete information on LANE-WELLS 314 sizes and types of Engineered Packers

General Offices, Export Office, Plant • 5610 So. Soto St., Los Angeles 58

LOS ANGELES • HOUSTON • OKLAHOMA CITY • LANE-WELLS CANADIAN CO. IN CANADA • PETRO-TECH SERVICE CO. IN VENEZUELA

PZ-81-A

Unique



"Newallastic" bolts and studs have qualities which are absolutely unique. They have been tested by every known device, and have been proved to be stronger and more resistant to fatigue than bolts or studs made by the usual method.

C. P. Newall & Co., Ltd.

POSSILPARK GLASGOW · N

# Indicates . . .

RELATIVE QUANTITIES OF FORMATION FLUID

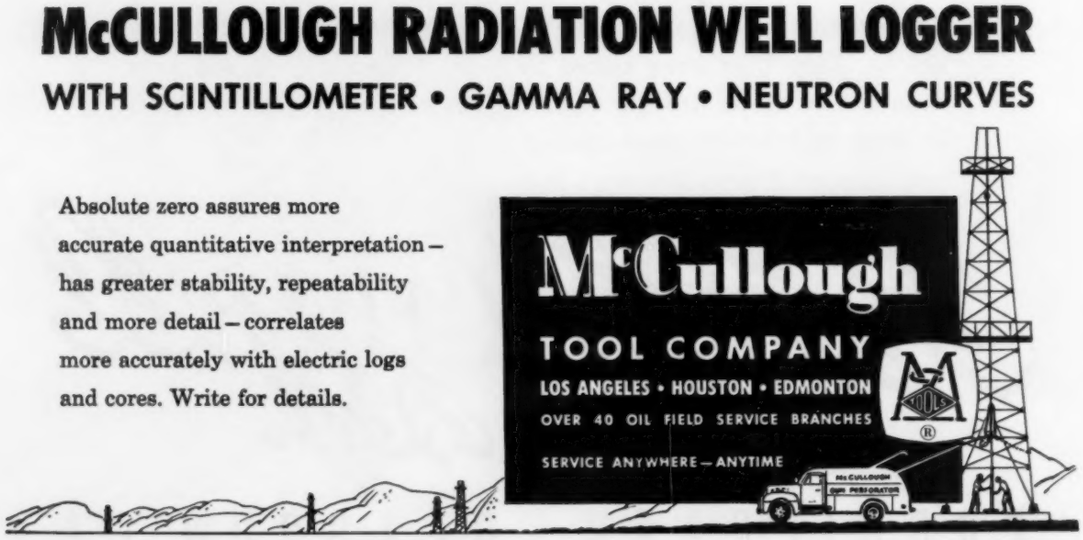
Accurately . . .

IDENTIFIES THE FORMATIONS

McCULLOUGH RADIATION WELL LOGGER

WITH SCINTILLOMETER • GAMMA RAY • NEUTRON CURVES

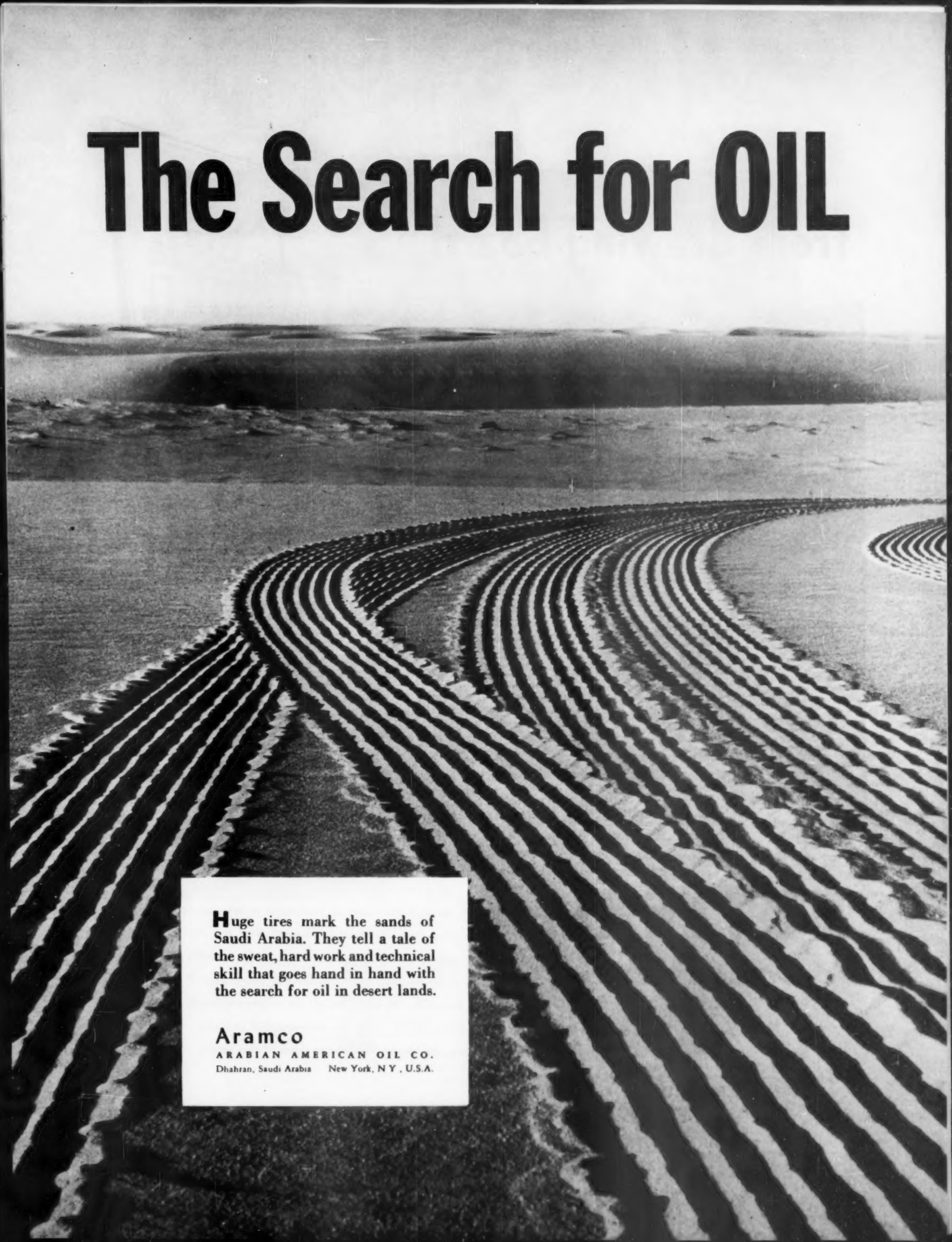
Absolute zero assures more accurate quantitative interpretation – has greater stability, repeatability and more detail – correlates more accurately with electric logs and cores. Write for details.



FOR BEST RESULTS LOG AND PERFORATE BY McCULLOUGH

WORLD PETROLEUM for December, 1954. Vol. 25, No. 13. December, 1954. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 604 Fifth Ave., New York 20, N.Y. Authorized as Second Class Matter, P.O. Dept., Ottawa; Canada. Subscription rates: $5.00 per year, single copies $1.00. Copyright 1954, by Mona Palmer, Trustee.

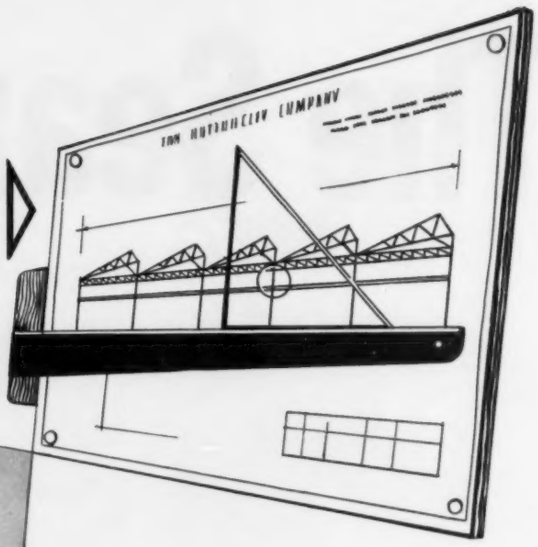
The Search for OIL



Huge tires mark the sands of Saudi Arabia. They tell a tale of the sweat, hard work and technical skill that goes hand in hand with the search for oil in desert lands.

Aramco
ARABIAN AMERICAN OIL CO.
Dhahran, Saudi Arabia New York, N.Y., U.S.A.

from drawing board



to erection on site

BUTTERLEY

Constructional Steelwork

The Butterley Company has been engaged in constructional steelwork from its early days and examples are to be found in all parts of the British Isles and in many countries overseas. From design, through the stages of fabrication to erection on site, every structure is invested with the skill and knowledge which have made the Butterley Company famous in the field of constructional steelwork. Welded methods are widely employed today and the shops are well-equipped to undertake the largest and heaviest work of this nature.

THE BUTTERLEY COMPANY LIMITED
RIPLEY, DERBY, ENGLAND
LONDON OFFICE: 20 ASHLEY PLACE, VICTORIA, S.W.1.
Phones: RIPLEY 411 (9 lines) VICTORIA 8023/4/5

CS-37

KNOWLEDGE
a power for good

The Standard-Vacuum organization is continually expanding its educational and training programs for its 40,000 employees in the various areas where it operates.

In Indonesia, for example, 71 formal training courses as well as on-the-job instruction are giving several thousand men new skills . . . teaching them to work as a team and to produce more . . . improving their ability to shoulder responsibility . . . adding to their economic security as individuals and their economic strength as citizens.

Stanvac seeks to do its part in developing the capacities of its employees so that they become better qualified to carry on the company's operations and to participate in supervisory and administrative functions.

Greater knowledge is truly a power for good.

STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

26 BROADWAY, NEW YORK 4, N.Y.

AUSTRALIA • BURMA • CEYLON • HONG KONG • INDIA • INDO-CHINA • INDONESIA • JAPAN • KENYA • MADAGASCAR
MALAYA • NEW ZEALAND • PAKISTAN • PHILIPPINES • PORTUGUESE EAST AFRICA • RHODESIA • SINGAPORE
SOUTH PACIFIC ISLANDS • SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

KETJEN

Founded 1835

Royal Sulfuric Acid Works N Amsterdam - Holland

KETJENCAT

m.s. fluid cracking catalyst

this m.s. fluid cracking catalyst of outstanding quality is available to all refineries in Europe, Asia, Africa and Australia

KETJENFORM

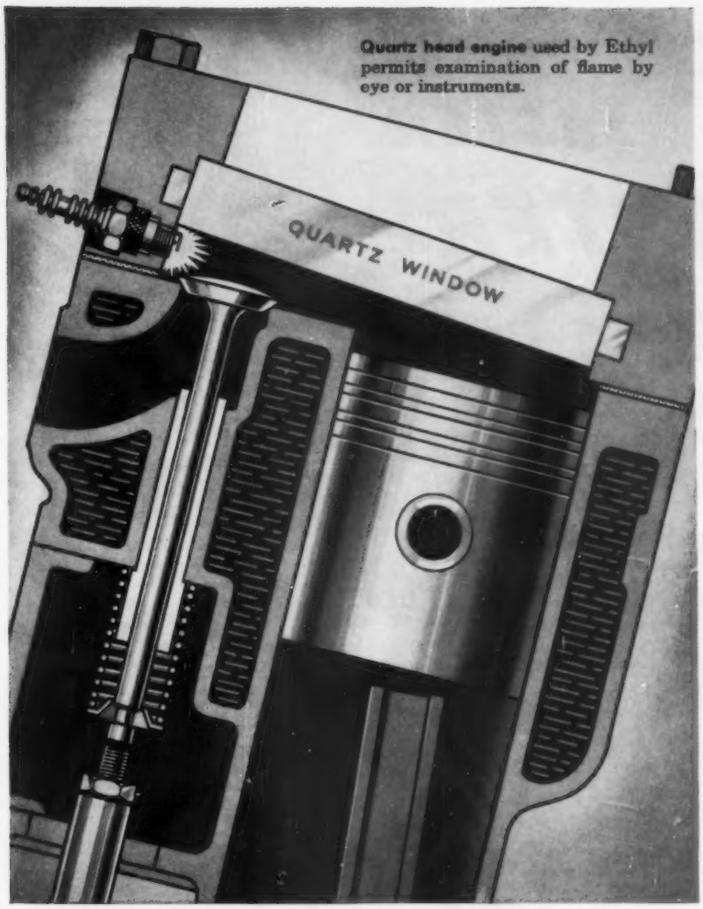
m.s. fluid hydroforming catalyst

production starting in 1955

For all information and offers please apply to:

Nederlandsch Verkoopkantoor voor Chemische Producten N.V.

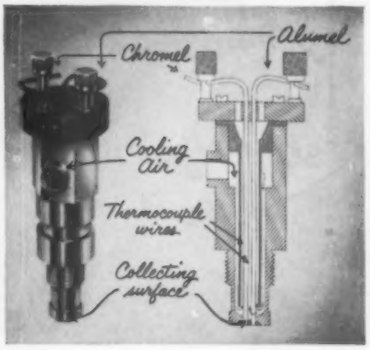
63, Mauritskade,
Amsterdam,
Holland
Postbox 4038,
Tel. 54322,
Telex 12270
Telegrams:
Chemicals



Quartz head engine used by Ethyl permits examination of flame by eye or instruments.

Pressure indicator developed by Ethyl research accurately senses the rapidly changing pressures in the engine cylinder and sends the information to an oscilloscope for measurement.

Thermal plug mounted in combustion chamber provides a removable, temperature-controlled surface for collecting samples of combustion deposits.



ETHYL RESEARCH TAKES A FLAME APART

to help tomorrow's engines run better

Locked up in the mystery of how gasoline burns is a vital secret. It is known that dozens of chemical combinations are formed and broken down in the flame. But what are they?

It's hard enough to find out what goes on in a candle flame. But when you put the flame in the center of a block of cast iron and permit it to endure less than a thousandth of a second, the problem becomes even more difficult. And the difficulty is further increased since many important changes occur in the fuel as the fuel-air mixture is compressed by the piston before the flame begins.

Yet how much can be done to improve today's engines depends in no small measure on how much can be found out about this vital problem.

Ethyl research people have been working on the problem for many years in many different ways. Recently they have developed new test instrumentation and have used existing instrumentation in new ways, which show great promise in piecing together the answers.

With the help of these new techniques we may all someday know considerably more about how gasoline burns. This will help refiners to make even more effective fuels, which will permit the production of more efficient engines than are practical today.

Ethyl continues its basic research into this vital question.

ETHYL CORPORATION
Research Laboratories

1600 West Eight Mile Road, Ferndale 20, Michigan
2600 Cajon Road, San Bernardino, California

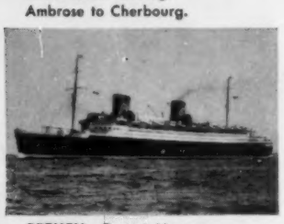
FASTER
FASTER
FASTER

SOCONY-VACUUM

And Still the Flying Red Horse Keeps Pace!

Some Blue Ribbon Winners of the Past!

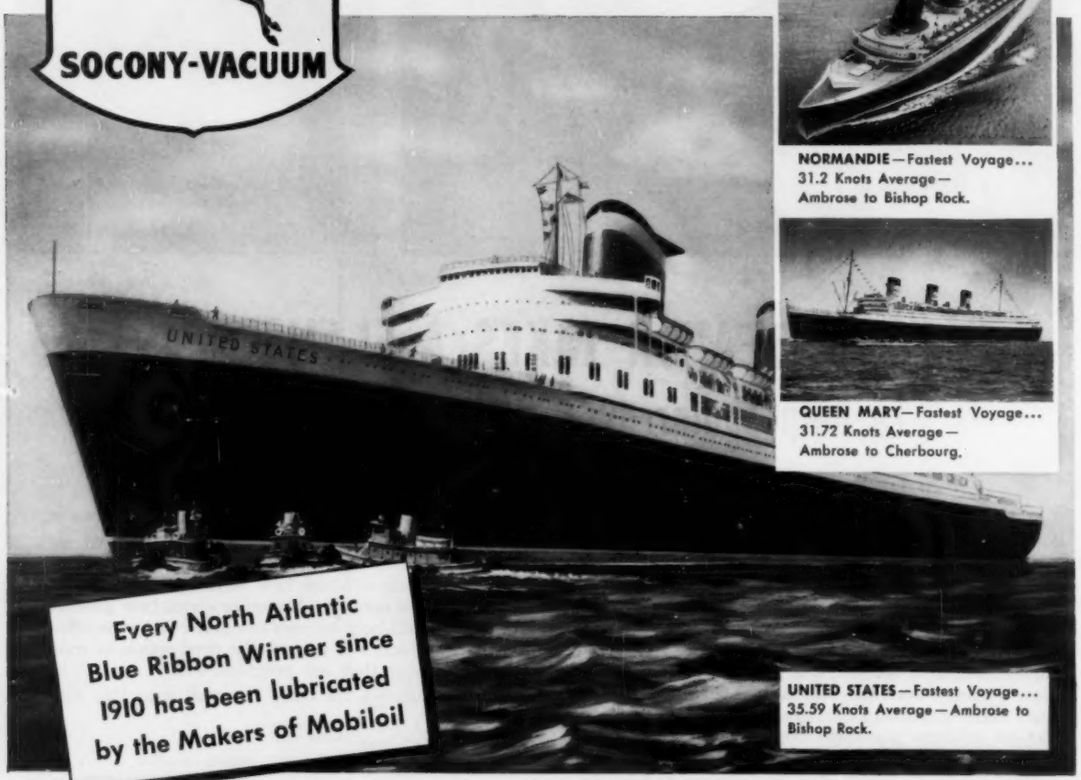
MAURETANIA—Fastest Voyage... 26.25 Knots Average—Ambrose to Cherbourg.



BREMEN—Fastest Voyage... 27.83 Knots Average—Cherbourg to Ambrose.

NORMANDIE—Fastest Voyage... 31.2 Knots Average—Ambrose to Bishop Rock.

QUEEN MARY—Fastest Voyage... 31.72 Knots Average—Ambrose to Cherbourg.



Every North Atlantic Blue Ribbon Winner since 1910 has been lubricated by the Makers of Mobiloil

UNITED STATES—Fastest Voyage... 35.59 Knots Average—Ambrose to Bishop Rock.

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates:

MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION

HTL announces the model 7000

. . . the most versatile seismic system available!

Designed to meet your specific requirements, the Houston Technical Laboratories' new Model 7000 provides the greatest versatility of any seismic system ever produced for commercial use. With an AGC control range of 1,000,000 to one, this compact and portable new HTL model is a high gain system (more than 120 decibels) ideally suited for magnetic recording and other special seismic applications.

The HTL Model 7000 gives you unchallenged superiority in distortion control and sensitivity with an input range from 0.1 microvolt to 0.1 volt between 10 and 200 cycles with less than 1% harmonic distortion. Unique filtering flexibility — 1380 filter combinations — plus advanced two-loop Automatic Gain Control add to the versatility of this new seismic system. AGC speed control on each channel provides a choice of three positions — slow, medium, or fast.

- 1,000,000 to 1 dynamic range
- input signals as low as 0.3 microvolt saturate AGC (AGC threshold 0.1 microvolt)
- 1380 possible filter combinations
- negligible distortion up to 0.1 volt input
- ideally suited for magnetic recording
- module construction for portable or vehicle use
- three AGC speed positions on each channel
- linear, time-varied gain, or AGC operation
- built-in complete testing facilities

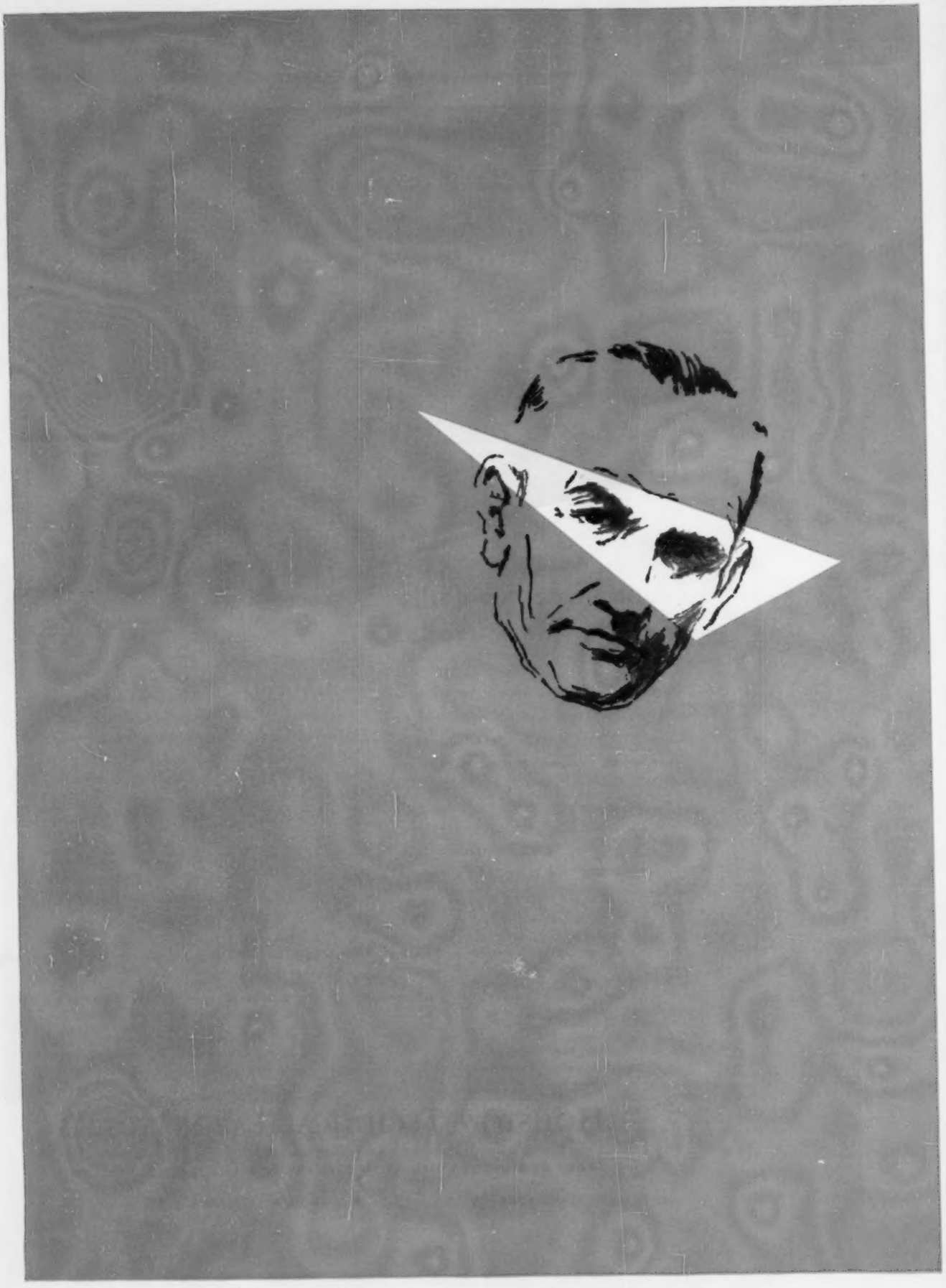
WRITE for HTL Bulletin No. S-304 for more detailed information about this completely new development in seismic instrumentation. Model 7000 systems now in production and available.

HTL

HOUSTON TECHNICAL LABORATORIES

A SUBSIDIARY OF TEXAS INSTRUMENTS INCORPORATED

2424 BRANARD • HOUSTON 6, TEXAS, U.S.A. • CABLE: HOULAB



more than meets the eye

Universal Oil Products Company is known, of course, for the far-reaching contributions it has made to the petroleum refining industry . . . and, hence, to the world . . . through the development and application of refining processes.

However, much is involved in this activity which is not at first apparent. Behind this continuing search for new and better methods and techniques there follows the necessary translation of the theoretical into the practical . . . painstaking pilot plant evaluation . . . experimentation . . . and the application of the most highly specialized engineering skills.

Further . . . these processes must be evaluated in terms of their adaptability to various charge stocks. The advantages, characteristics, limitations and applications must be defined. Design data, engineering specifications, construction and operation costs . . . all must be assembled. It is the sum of these factors that determines the worth and usefulness of each process.

And to make doubly certain of continued usefulness . . . Universal Service . . . year after year post-on-stream assistance is available to meet the needs of every petroleum refiner.

All of this, Universal is well equipped to do . . . has been doing for years . . . and is, perhaps, in a better position to do than any similar organization serving the petroleum refining industry.

UNIVERSAL OIL PRODUCTS COMPANY

UOP

30 ALGONQUIN ROAD,
DES PLAINES, ILL., U. S. A.
Laboratories: RIVERSIDE, ILLINOIS

Universal Service Protects Your Investment

...it's *Stringtime* in the Rockies

A sure sign that the oil hunters are at work is the seismic string — the "jugs" and cable used in recording shock waves from charges the seismic crews fire as they search for spots where oil might be found. The strings are busy in the Rockies these days and among the busiest are those from Shell Oil Company. The work of the seismic crews is one of the many costly operations undertaken in the continuous exploration for new oil fields — to serve a nation that moves on petroleum.

SHELL

SHELL OIL COMPANY

OIL
MUST BE DISCOVERED

An SSL seismic crew on assignment in Holland.

This densely populated country makes a picturesque background for seismic work, but provides its own difficulties.

The fertility of the land, almost half of it lying below sea level, represents the toil and struggle of generations, and the utmost care must be taken not to cause damage. The breaching of the dykes by careless shooting would spell disaster.

The network of canals which has to be crossed and recrossed calls for ingenuity in the planning and the carrying of the equipment.

Prospecting for petroleum in HOLLAND is only one of the many assignments contracted for by Seismograph Service Limited. Drawing from the technical experiences of its world wide associate companies —Compagnie Française de Prospection Sismique; Seismograph Service Corporation of U.S.A.; and S.S.C. of Canada, Venezuela, Mexico, and Colombia—and at the same time compiling the specialized know-how and experience from its own assignments, Seismograph Service Limited is prepared to undertake seismic exploration under even the most difficult of conditions.

Seismograph Service Limited

CABLE ADDRESS:
"SEISLIM, LONDON"

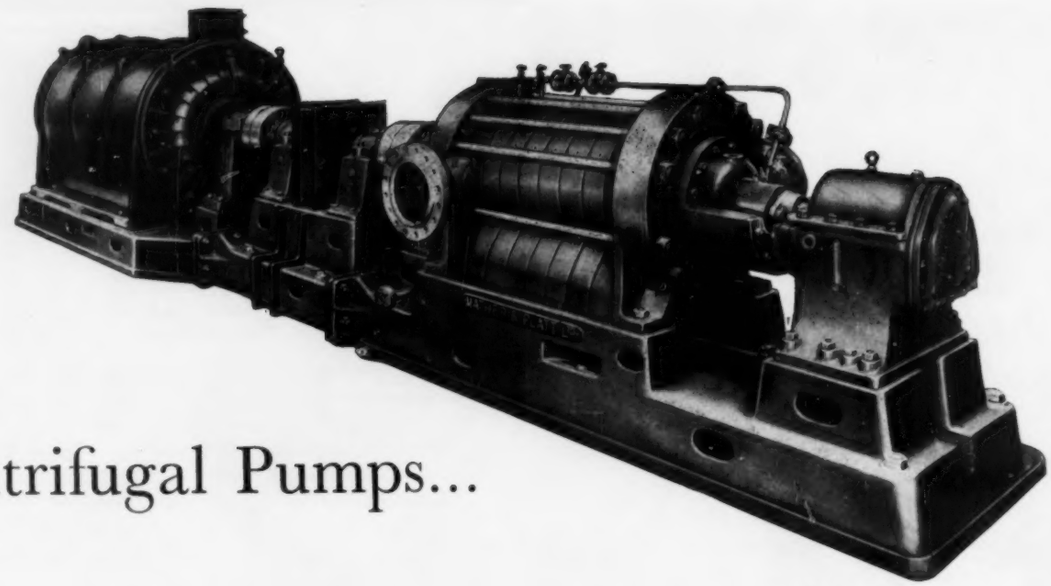
INLAND TELEGRAPHIC ADDRESS:
"SEISLIM, BROMLEY"

"HOLWOOD," KESTON, KENT, ENGLAND

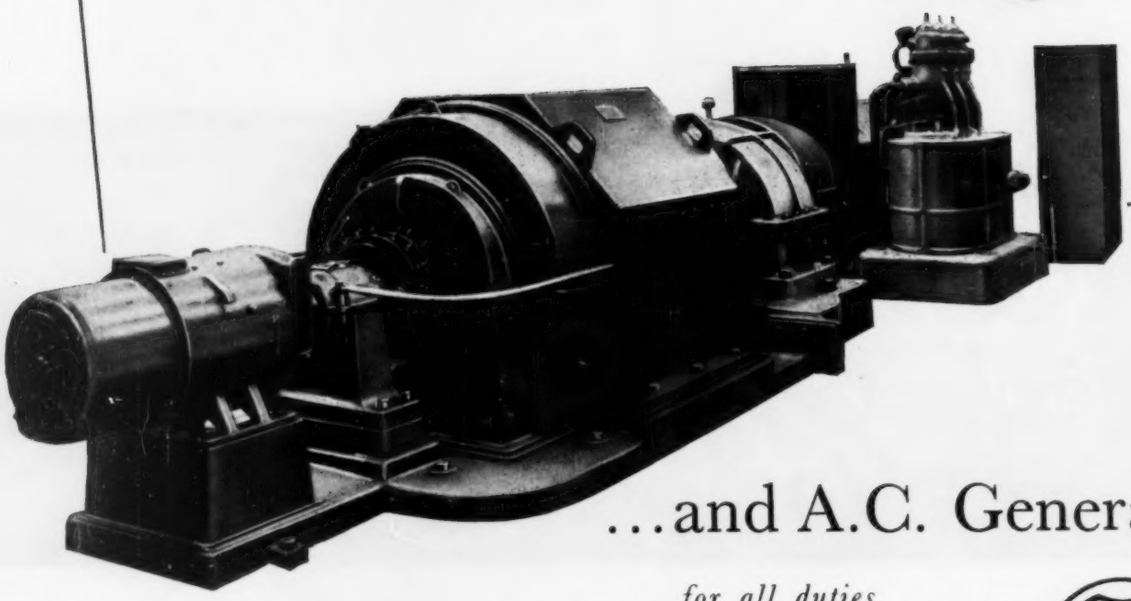
SUBSIDIARY OF SEISMOGRAPH SERVICE CORPORATION, TULSA, OKLAHOMA, U. S. A.

From Field to Refinery...

...Electric Motors



Centrifugal Pumps...



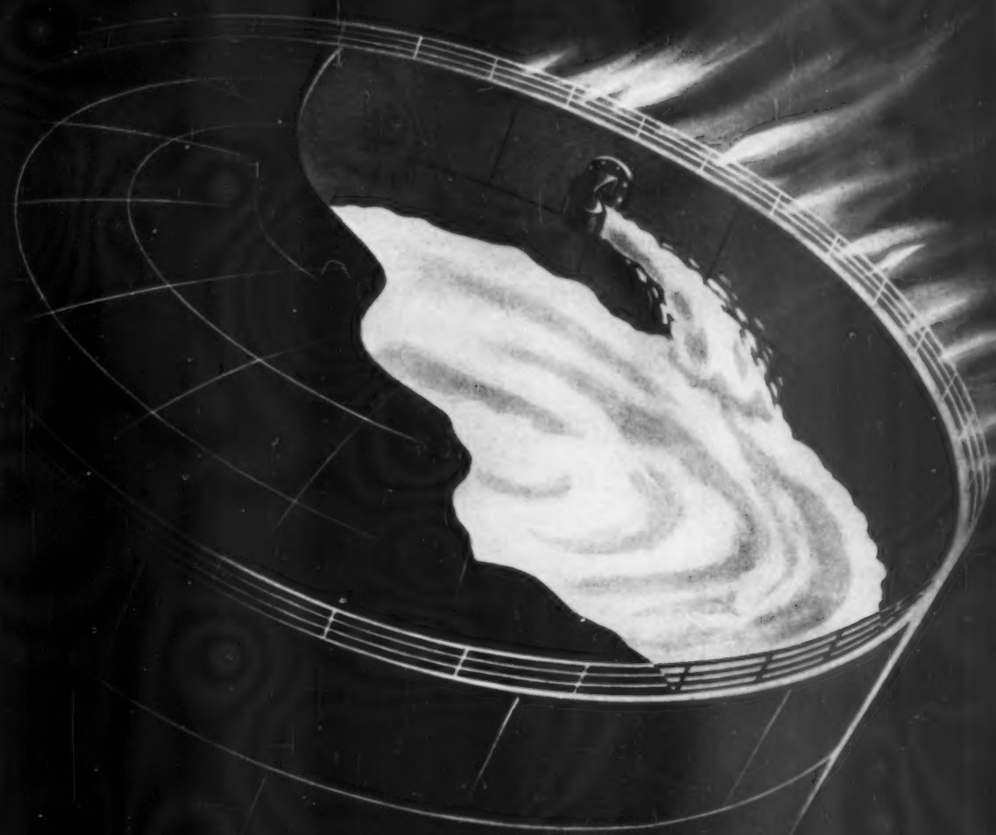
...and A.C. Generators

for all duties

239

MATHER & PLATT LTD Park Works Manchester 10 · Park House Gt. Smith St., London S.W.1

It blankets . . . it kills . . . it seals . . . OIL FIRES



The smothering action of Pyrene Mechanical Foam not only rapidly extinguishes fire but effectively seals off the surface of blazing liquid so that the threat of re-ignition is eliminated. This fire killing foam is extensively applied to storage tanks either by means of fixed foam risers, Pyrene Foam Towers or other types of portable foam equipment.

Pyrene TRADE MARK

MECHANICAL FOAM

An investment in peace of mind

Write to Dept. WP 12 **THE PYRENE COMPANY LTD.** 9 GROSVENOR GARDENS, S.W. 1, ENGLAND. *'phone* VICTORIA 8401. *Cables* PYRENE, LONDON.

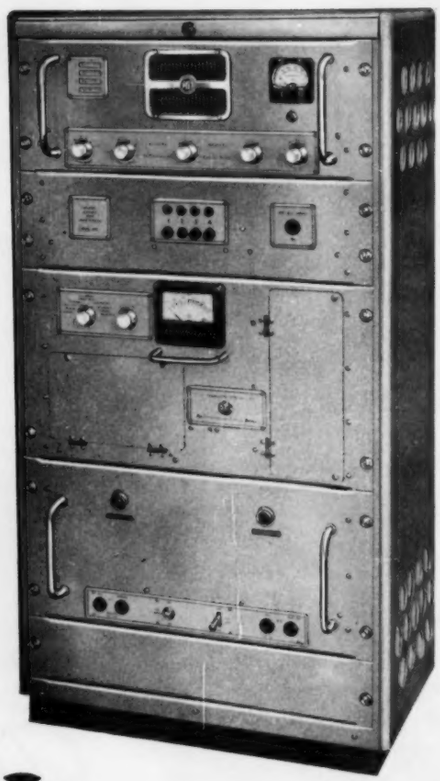
CANADIAN PLANT *Pyrene Manufacturing Company of Canada Limited, 91 East Don Roadway, Toronto 8.*

60 WATT H.F. FIXED STATION

This completely new Pye equipment has been specifically designed for point-to-point communication and will fulfil equally well a ground-to-air role in air traffic control systems.

Push button control brings any one of four preselected channels into immediate operation; this facility is also available when the equipment is installed for remote unattended operation. The 60 watt Fixed Station Transmitter offers R/T, C/W, or M.C.W. operation with 'break-in' facilities on telegraphy.

The equipment is suitable for unattended operation in the tropics.



Telecommunications

CAMBRIDGE ENGLAND

Pye (New Zealand), Ltd., Auckland C.I., New Zealand.	Pye Canada, Ltd., Ajax, Canada	Pye-Electronic Pty., Ltd., Melbourne, Australia.	Pye Ireland, Ltd., Dublin, Eire.
Pye Radio & Television (Pty.) Ltd., Johannesburg, South Africa.	Pye Limited, Plaza de Necaxa 7, Mexico 5.	Pye Limited, Tucuman 829, Buenos Aires.	Pye Limited, 5th Avenue Building, 200 5th Avenue, New York.

PYE LIMITED · CAMBRIDGE · ENGLAND

DU PONT

PETROLEUM CHEMICALS DIVISION

NEWS

DU PONT

December ★ One of a Series of Interest to the Petroleum Industry ★ 1954

Unique Spectrometer Traces Little Known Reactions Leading to Knock

At the Du Pont Petroleum Laboratory, new light is being focused on happenings in the combustion chamber.

Research scientists using a new spectrometer are now able to study, as never before, what goes on in the combustion chamber just before knock.

The apparatus, which was developed for the Petroleum Laboratory, is built around a single-cylinder engine. Light is passed through windows in opposite sides of the combustion chamber—in one window and out the opposite. The engine is operated in such a way as to cause the reactions leading to knock to take place throughout the entire combustion chamber rather than, as is normally the case, in only a small portion of the chamber.

Electrical Impulses

As the light passes through the mixture in the engine some of its energy is absorbed by the chemicals present in the combustion chamber. The light leaving the engine is converted into electrical impulses for automatic recording on a strip chart. Combustion chamber windows of quartz, rock salt and lithium fluoride make it possible to cover the ultraviolet visible and infrared regions.

Because each chemical reaction in the chamber varies the amount of light that gets through at different wave lengths, the spectrometer can make a record—automatically—of changes taking place within the chamber.

First of its kind

This is the first spectrometer of its kind. And it is being used exclusively to determine what causes knock and how tetraethyl lead and other materials react in the fuel to prevent it. From equipment such as this, it is hoped, new ways of suppressing knock will be discovered. Already the spectrometer is beginning to yield valuable information on hydrocarbon radicals formed under pressure in the combustion chamber—and their role in knock.

When final results of these tests have been analyzed, findings will be published and made available to the petroleum and automotive industries.

Two New Type Lube Oil Additives Developed by Du Pont

New polymeric additives offer low-cost solution to sludge problems resulting from low-duty engine operation

Since sludge deposits caused by stop-and-go driving are a major problem in the average passenger car, two new Du Pont lube oil additives can give you a tremendous sales advantage in the motor oil market by overcoming this widespread trouble. They also offer outstanding advantages to operators of urban taxi, bus and truck fleets.

Sludge problems in the making! Stop-and-go city driving conditions like this are a major cause of engine sludge.

The two new additives are *Du Pont Lube Oil Additive 564* and *Du Pont Lube Oil Additive 565*. Both are polymeric additives with outstanding detergency and varying in shear stability and viscosity-index improving properties.

Double-action

These two-way detergent and V. I. improving addi-

OVER

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

DU PONT

PETROLEUM CHEMICALS DIVISION
NEWS

DU PONT

CONTINUED *New Additives*

tives are economical and exceptionally effective in retarding sludge formations caused by low-power, low-temperature and other driving conditions. Thus, they help to maintain good engine lubrication and to extend the useful life of the engine.

Reduces sludge

These ashless polymeric lube oil additives maintain more efficient operation of the engine oil system. Oil screens, filters and oil lines are kept clean and sludge-free. And the resulting free flow of oil through the engine keeps it in better operating condition.

Cost less than other detergents

The new Du Pont polymeric lube oil additives are effective in low concentrations. This, combined with their two-way detergent–V. I. improver action, means lower cost manufacture of multi-graded oils of superior performance.

Test results

To test the effectiveness of *Du Pont Lube Oil Additive 564*, a fleet of taxicabs was run for 50,000 miles of low-duty service. Factory-new engines were installed in all cabs at the beginning of the test, with oil-drain periods established at 4500 to 5000 miles.

Some of the test cars were operated with a representative heavy-duty motor oil (For Services MS and DG). Others were operated with the same base oil to which *Du Pont Lube Oil Additive 564* and an antioxidant had been added.

The results of this test are shown clearly in the following photographs.

NOTICE THE DIFFERENCE in sludge on the oil screen and timing gear cover on the left as compared to the clean appearance of the corresponding parts at the right. Those on the left were operated on a representative heavy-duty motor oil (For Services MS and DG). The cleanliness of those on the right resulted from the use of the same base oil to which Du Pont Lube Oil Additive 564 and an antioxidant had been added.

Continued—bottom of next column

Commercial quantities of both these new Du Pont additives are now available. For testing their effectiveness in your own oils, any of our regional offices listed below will be glad to arrange for free samples.

ASSISTANT EASTERN REGION MANAGER

WESLEY T. DORSHEIMER was recently named Assistant Manager, Eastern Region, by the Du Pont Petroleum Chemicals Division. Prior to this appointment he had served as an Account Manager of the Eastern Region.

He joined the Du Pont Company in 1952 as a sales-service representative in the Petroleum Chemicals Division. He started his career as an engineer in the Technical Service Division of the Esso Standard Oil Company at Bayway, New Jersey. He then became a sales engineer for C. F. Braun and Company in Alhambra, California. From 1948 until he joined Du Pont, he was assistant sales manager of the Chemical Industries Division of the Foxboro Company in Foxboro, Massachusetts.

Mr. Dorsheimer was graduated from Carnegie Institute of Technology with a B. S. degree in chemical engineering.

WESLEY T. DORSHEIMER

He is a member of the American Chemical Society and the American Institute of Chemical Engineers.

Du Pont Metal Deactivator Valuable Additive for Distillate Fuel Oils

When used in diesel and home heating oils, Du Pont Metal Deactivator (DMD) has *three* outstanding advantages.

1. It retards residue formation during storage. In the distribution of distillate fuels it is difficult to avoid copper contamination which accelerates oxidation reactions. This copper is rendered inactive by the addition of extremely small quantities of DMD.

2. It prevents color deterioration caused by copper catalyzed reactions.

3. It inhibits formation of copper mercaptide. Copper mercaptides formed by the reaction of mercaptans with copper or brass sometimes pose a serious problem in diesel and heating oils. They can plug filters or other parts and completely stop the flow of oil. An economical way of minimizing the harmful effects of this reaction is to deactivate the copper chemically with DMD.

Although DMD is highly effective when used alone in fuel oils, it is of maximum value when used in combination with an antioxidant and dispersant such as Du Pont Fuel Oil Additive No. 2.

DU PONT

Better Things for Better Living . . . through Chemistry

Petroleum Chemicals

E. I. DU PONT DE NEMOURS & COMPANY (INC.)
Petroleum Chemicals Division • *Wilmington 98, Delaware*

Regional Offices:
NEW YORK, N. Y.—1270 Ave. of the Americas . . . Phone COlumbus 5-2342
CHICAGO, ILL.—8 So. Michigan Ave. . . . . Phone RAndolph 6-8630
TULSA, OKLA.—1811 So. Baltimore Avenue . . . . . Phone Tulsa 5-5578
HOUSTON, TEXAS—705 Bank of Commerce Bldg. . . Phone BLackstone 1151
LOS ANGELES, CALIF.—612 So. Flower St. . . . . Phone MAdison 5-1691
IN CANADA: Du Pont Company of Canada Limited—Petroleum Chemicals Division, 80 Richmond Street West, Toronto 1, Ontario
OTHER COUNTRIES: Petroleum Chemicals Export—Nemours Bldg., 6539—Wilmington 98, Del.

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

A-8324

Printed in U. S. A.

CAPOSITE-insulated pipe-lines at the Anglo-Iranian Oil Co's Kent Oil Refinery.

we've a long FIBRED start!

As compared with other forms of asbestos insulation, CAPOSITE enjoys one very considerable advantage. This is in the matter of fibre-length — a key factor in the thermal efficiency of all asbestos materials. CAPOSITE is made from the uniquely long-fibred type of asbestos known as *amosite*, obtained from The Cape Asbestos Co's own mines. This extra length of fibre gives it a long start, both in thermal efficiency and in other important respects as well; in greater durability, for example, without any corresponding excess of weight. CAPOSITE is available in moulded form to suit the contour of the surface to be insulated. It is easily applied, combining lightness in weight with exceptional strength and durability. CAPOSITE Insulations are designed for use up to 1,000°F. For temperatures in excess of 1,000°F there is a complete range of CAPOSIL High Temperature Insulations.

CAPE

CAPOSITE

The Cape Asbestos Company Limited, 114-116 Park Street, London, W.1. Tel: GROsvenor 6022

United States Enquiries: North American Asbestos Corp., Board of Trade Bldg., Chicago 4, Ill.

TA675

MEAN BETTER MUD

Magcobar's new general offices and laboratories in Houston mean better mud service for you!

Unexcelled research, product development, field service, geological and engineer training laboratories help to make Magcobar's drilling mud service the most complete in the industry.

1. LIBRARY
This new addition to the Research Department, which is available to all other departments, contains reference books on chemistry, chemical engineering, physics, petroleum engineering, and geology.

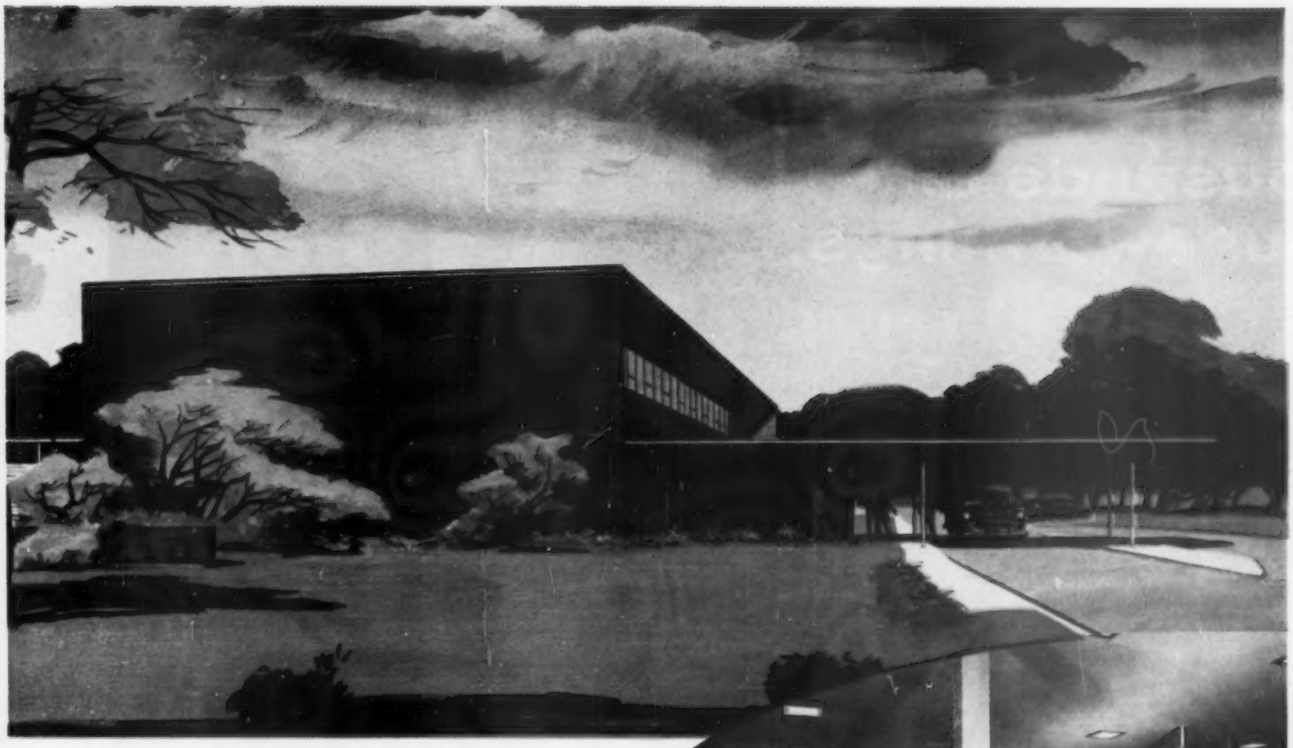
2. RESEARCH LABORATORIES
Many of Magcobar's new products had their birth in the company's research laboratories. This is one of three labs in constant use in the search for new drilling mud products and additives that will allow more economical, faster and more efficient drilling.

3. FIELD SERVICE LABORATORY
This laboratory stands behind every one of Magcobar's several hundred field service engineers. Here research specialists with extensive field experience are continuously at work on field mud problems.

4. RECEPTION LOBBY

5. ACCOUNTING DEPARTMENT
The various phases of accounting and the keeping of company records are handled in the accounting department.

6. ANALYTICAL LABORATORY
This laboratory evaluates production samples to insure that highest possible uniform quality



SERVICE FOR YOU

So Magcobar, the company that was built on good service, high quality and fair and reasonable prices, now offers **better** mud service at **your** rig as a result of continued growth and expansion. Magcobar means the best service in the oil fields.

MAGNET COVE BARIUM CORPORATION
ONE OF THE DRESSER INDUSTRIES
HOUSTON, TEXAS

is maintained in every Magcobar product. The analytical lab also aids the geological office in the evaluation of exploration samples from various localities.

7. ENGINEER TRAINING LABORATORY

As part of their extensive mud training program, Magcobar engineers receive six weeks of concentrated study in all phases of drilling mud testing and servicing. In addition, the mud engineers receive several weeks of field indoctrination followed by a sales training program at Magcobar's headquarters. When these "mud doctors" are finally assigned to the field, they are trained to provide the finest mud service available.

In addition to this laboratory's function as a training area for Magcobar engineers, oil industry personnel are always welcome to take any or all of Magcobar's training course. During the past few years several hundred such people have attended this training school.

8. GEOLOGICAL SECTION

This office is the headquarters for the men in the geological department who spend the major part of their time in the field searching and testing new deposits to enable Magcobar to maintain adequate high quality raw material supplies for the oil industry in the future.

Magcobar
Complete
DRILLING MUD SERVICE

Homeowners and plant managers bought more than 1,103,000,000 gallons of our fuel oil last year—more than ever before.

CITIES SERVICE

A Growth Company

THE NEW AIR PRESSURE LIGHTING UNITS

First and only approved lighting for hydrogen areas*

Platforming
Hydrofining
Catforming
Unifining
Hydroforming
Houdriforming
Ammonia
and other petrochemicals involving any hydrogen

SL-200 150,200,300 watt pendant fixture, air pressure type; air and water integrity; 2500 hr. lamp; heat resistant and tempered lens; corrosion and weather-proof; max. temp. 88°C; silicone lens gasket, rated 450°F. APPROVED CLASS I, GROUPS A, B, C, D CLASS II, GROUPS E, F, G

PROVIDES Underwriters' Laboratories approval for all hazardous areas; only units approved for class I, groups A & B. (acetylene, hydrogen, manufactured gas)

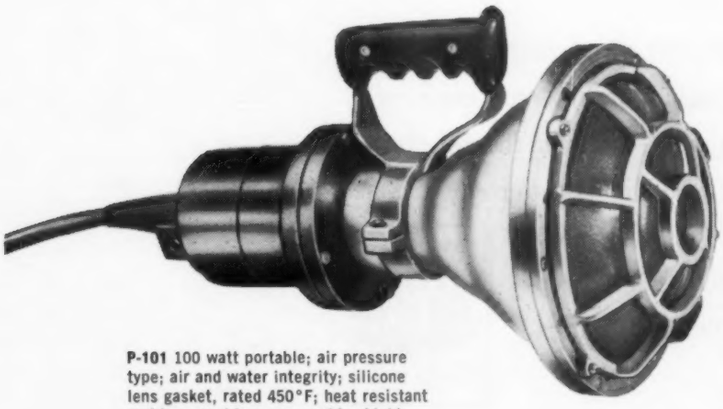
PROVIDES absolute, not relative safety. Only fully explosion-proof lighting available.

PROVIDES interior air pressure 15 psi greater than surrounding gas atmospheres and prevents entrance of any gas, paint vapors, dusts, etc. Air pressure is self-contained and lasts life of lamp.

ELIMINATES breathing and seepage occurring in all "explosion-proof" and "vapor-proof" units.

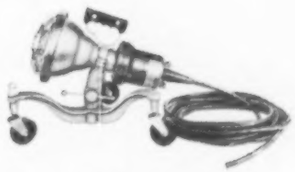
ELIMINATES explosions which occur by ignition of seeped-in gases, dusts, etc.

ELIMINATES explosions during moment of damage. Air Pressure units extinguish automatically at 3½ psi.



P-101 100 watt portable; air pressure type; air and water integrity; silicone lens gasket, rated 450°F; heat resistant and tempered lens; removable shield; 4000 hr. lamp; Wt. 8½ lbs; first static-free cable available for portable floodlights. APPROVED CLASS I, GROUPS A, B, C, D

PS-102 200 watt portable on stand



P-101 on Dolly Stand for Truck, Automotive, Airplane Maintenance, etc.

S

Safety is Saving

Write for descriptive catalog to:

AIR PRESSURE LIGHTING DEPT.

Safe Lighting Inc.

91-03 Astoria Blvd. / Jackson Heights, N. Y.

CATFORMING *means*

High Octanes...
High Yields...
Low Cost...
Proved Performance

These advantages of Atlantic Catforming are being demonstrated again and again in different commercial installations. We invite you to share in the benefits of Catforming. Please phone, write or wire for our detailed brochure, "CATFORMING." The Atlantic Refining Company, Research and Development Dept., P. O. Box 8138, Philadelphia, Pa.

ATLANTIC *It's the Catalyst that counts*

VOL. 25, NO. 13, DECEMBER, 1954

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

FOUNDED BY RUSSELL PALMER

MONA PALMER, Publisher

E. W. MAYO, Editor

J. C. CHATFIELD, Managing Editor

E. W. MAYO, JR., Sales Manager

W. E. ANDERSON, Associate Editor

J. R. TISSAVARY, Art Director

NBP BPA

Member of National Business Publications, Inc., and Business Publications Audit of Circulation, Inc.

SUBSCRIPTIONS

Annual subscription $5.00 (U.S.) postpaid
Single copies $1.00

GENERAL OFFICES

604 Fifth Avenue, New York 20
(Tel. JUdson 6-4820)

BRANCH OFFICES

LONDON, ENGLAND

G. L. Fetherstonhaugh, St. Paul's Corner, Ludgate Hill, London E.C.4
(Tel. CITY 5318)

HANNOVER-S, GERMANY

Kurt Buge
Annenstrasse 11
(Tel. 8-4179)

LOS ANGELES 14

T. T. Drake
412 West Sixth St.
(Tel. MUtual 1391)

NEW YORK 20

Sales Representatives:
E. L. Townsend, R. K. McQuiston, R. E. Slimermeyer
604 Fifth Avenue
(Tel. JUdson 6-4820)

TULSA 3

O. F. Cozier, Mid-Continent Advertising Manager, 305 Daniel Bldg.
(Tel. 4-5555)

DALLAS 1

World Petroleum Statistical Yearbook
H. J. Struth, Editor
626 Reserve Loan Life Bldg.
(RAndolph 5515)

World Petroleum is published by Mona Palmer, Trustee under the will of Russell Palmer.

CONTENTS

27 Petroleum in the Atomic Age

28 Lion Oil Operations Now 50% in Petrochemical Field

33 Fourth World Congress Prepares for Large Attendance

34 "Mister Gus" Goes to Sea, by James W. Calvert

38 Are Oil Imports Responsible for Coal's Problems? by Walter J. Levy

41 Iranian Oil Begins Moving Again

42 The Iranian Oil Agreement, by Howard W. Page

44 F. O. A. Studies Possible Uses of Middle East Gas

46 Pacific Northwest Pipeline Key to New Frontiers, by Tom Dougherty

50 1953 World Oil Demand 5.5 Percent Higher

53 Washington Sees Change of Faces as Main Result of Election, by Joseph Huttlinger

54 Technical Committee Meetings Key to World-Wide Coordination of Research

56 Washington Pipe Line, by Joseph Huttlinger

58 Canada

64 International News & Notes

70 Oil Company Staff Changes

90 Advertisers' Index

THIS MONTH'S COVER

Carbon dioxide removal at the recently-dedicated petrochemical plant of Lion Oil Co. at Luling, La. A Girdler methanolamine scrubber is employed to separate CO_2 from mixed gases prior to ammonia synthesis. Color photograph is by Elwood Payne, Houston, and plates are reproduced through the courtesy of Lion Oil Co., El Dorado, Ark. An article describing Lion's new fertilizer plant will be found in this issue beginning on page 28.

Greetings from Halliburton

Petroleum in the atomic age

WITH THE PROSPECT of the utilization of atomic power for commercial purposes and of private capital's being allowed to participate in this field of development, an evaluation of the potentialities of this new and, to laymen at least, somewhat mysterious force is being considered. The door to this broader application of nuclear power has been opened by the Atomic Energy Act passed by Congress earlier this year, although the actual entrance of private enterprise into this field must await interpretation by the Atomic Energy Commission and its legal advisers of the rigid restrictions imposed by the measure.

With full recognition, however, of the delays that must be inevitable before commercial organizations are permitted to engage in the production of atomic energy and of the strict government supervision that certainly will be imposed upon such undertakings, it must be recognized that this legislation presents both an invitation and a challenge to individual enterprise to enter a field which heretofore has been confined exclusively to the ends and aims of governmental endeavors. That both the invitation and the challenge will be accepted by the leaders of research, invention and investment goes without saying.

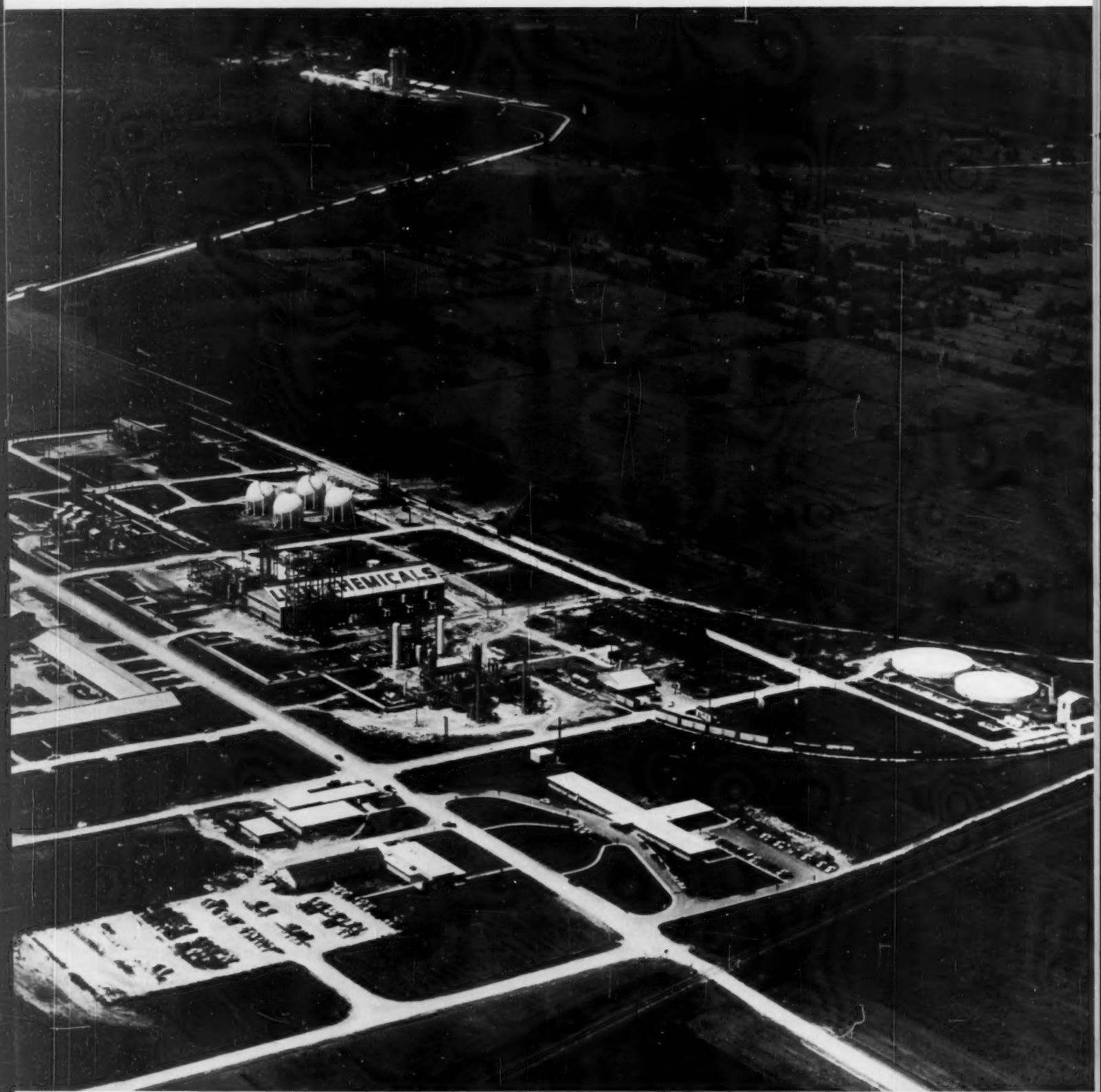
So little exists in the way of experience and knowledge of the practical application and the limitations of nuclear energy in relation to the affairs of the workaday world that it is not surprising to read and hear some sweeping prognostications as to its probable effect upon particular industries. For example, some commentators upon its bearing upon the future of petroleum not only foretell a drastic effect upon all classes of hydrocarbons, but have even set up a timetable as to when this influence will make itself felt. Up to about 1970, they say, oil and gas will continue to increase their share in the total supply of energy, but from that time on they will fall progressively behind until, presumably, they will be entirely displaced.

Those scientists and devotees of research who have studied the theory and application of nuclear energy are much less assertive in their estimate of its effects. In the first place, they anticipate a tremendous increase in the world's demand for energy which will make the problem not one of selection, but rather one of finding agencies to provide a supply sufficient to meet all the needs that may be brought into existence. Moreover, they realize that each particular form of energy, those that now exist and those that in future may come into play, has special applications to which it is adapted that will enable it to hold a place in the whole broad scheme of world activity.

At a series of panel meetings held in New York in mid-October under the auspices of the National Industrial Conference Board, some two thousand industrialists and atomic scientists from all parts of the world participated. During this series of meetings the field of nuclear study and its application to such divergent activities as chemical manufacture, agriculture, food supply and health as well as power production was discussed by men who have been delving into the general subject, in many cases for years.

Among the speakers at the round table discussions of the conference was Dr. Robert E. Wilson, chairman of the board of Standard Oil Co. (Ind.), whose utterances on any subject in the field of research are entitled to careful consideration. He expressed the opinion that at no time in the foreseeable future will the oil industry be adversely affected by atomic development, but that, if anything, oil will benefit from atomic growth. He mentioned as possible benefits the use of radioactive tracers in research and operation and the increase in travel that would result from the decentralization of industry and population that will come with the atomic age.

Directing attention to obvious roadblocks in the way of utilizing atomic energy for land, sea or air transportation, Dr. Wilson suggested that in the course of 10 to 26 years some large power plants might be built to utilize atomic fuel, but he added that no efficient existing plant would be shut down or changed to atomic power. About the only refined output likely to be seriously affected by atomic competition in the near future, he believes, would be heavy fuel oil, the least profitable of the industry's products. With a tenfold increase looming in world requirements during the next century, the oil industry seemingly has little cause for immediate worry.



An aerial view of the Barton plant, Lion Oil Company's petrochemical installation near New Orleans, La. In the foreground are the administrative, anhydrous ammonia and nitric acid areas. In the distant background is the ammonium nitrate area.

Thomas Harry Barton, chairman of Lion Oil Co., in whose honor the company's new $30 million petrochemical plant was named.

LION oil operations now 50% in petrochemical field

LION OIL CO. dedicated its second major nitrogen fixation plant October 25 at Luling, La. with ceremonies attended by Governor Robert F. Kennon and other Louisiana officials. The $30 million installation, producing 300 tons per day of ammonia, was named in honor of Thomas H. Barton, chairman of the company, who has guided the organization from a small local independent producer and refiner with $7 million in assets to a $145 million corporation within the space of 25 years.

Completion of the Barton plant brings Lion's interest in petrochemicals to the same stature as its interest in normal oil operations. Capital investment in oil and chemicals and current net profit are nearly equal. Tonnage of oil and dollar value of oil sales still are far greater. Total sales this year will approximate $100 million and chemicals $30 million. Profit margin on chemical sales is higher than on oil. This is particularly true at present since refined oil prices are low in relation to crude markets.

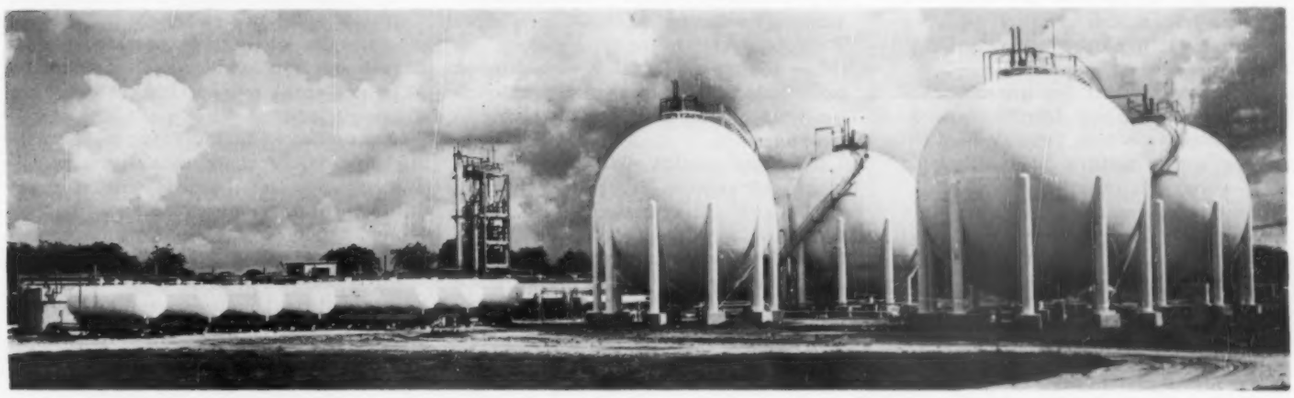
The new plant is located on a 1,400-acre tract on the banks of the Mississippi river 14 miles above New Orleans. It thus is strategically located for water transportation to export markets, along the Gulf and Atlantic coasts and the rich agricultural areas traversed by the Mississippi.

The process installed at the Barton plant is essentially the same as that which has been employed successfully for the past 14 years at El Dorado, Arkansas, where Lion began manufacturing nitrates for the government during World War II. The El Dorado plant has been largely increased in capacity since it was purchased from the government and now produces a total of 570 tons per day of ammonia.

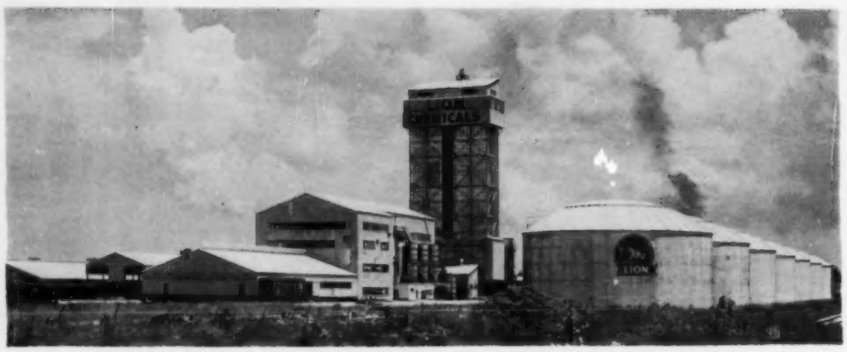
At the Barton plant, dry natural gas is reformed for hydrogen production and nitrogen is extracted from the air for fixation in anhydrous ammonia by catalysis. By-product carbon dioxide is sold in liquid and solid form. Part of the ammonia produced is sold in anhydrous form and the remainder is converted to ammonium nitrate for sale as solid fertilizer. The El Dorado plant produces ammonium sulfate, nitrogen fertilizer solution, anhydrous ammonia and ammonium nitrate. Carbon dioxide is not recovered.

Completion of the Barton plant brings Lion's ammonia capacity to 870 tons per day. Replacement value of its ammonia plants exceeds $85 million. The company thus becomes one of the largest producers of ammonia in the country. Its output is about ten percent of the current United

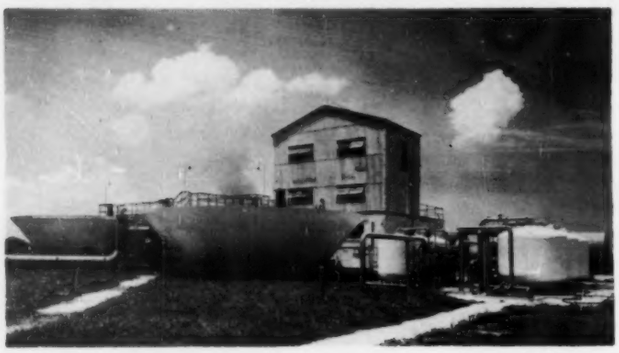
Hortonspheres for the storage of anhydrous ammonia. Each of the four spheres has capacity for the storage of 1,300 tons of ammonia. The cylindrical tanks at the left are scale tanks which receive and weigh anhydrous ammonia produced at the plant before transfer to the spheres or to other parts of the plant for further processing.



"Shot towers" and manufacturing buildings where pelleted ammonium nitrate is made. Liquid ammonium nitrate is sprayed from the top of the 208-foot towers to fall against an updraft of conditioned air. The spherical pellets which form are dried, cooled and coated with a dusting of clay before being bagged in moisture-proof bags. The material is used both as a direct fertilizer and as the nitrogen source in mixed fertilizer.



The water treating plant which purifies water from the Mississippi River for use in Barton plant operations. Circulation is about 100 million gallons daily. Make-up water totals seven million gallons daily.



Gas reform section of the anhydrous ammonia plant at Lion Oil Company's new chemical installation.

States demand. Lion now is one of the five largest manufacturers in the country.

Lion's development in petrochemicals is a logical outgrowth of the management's interest in southern farming. Prior to construction of the new Barton plant, the company's manufacturing has been centered at El Dorado, Ark., in a predominantly agricultural area and its prosperity has been linked to that of the farm. It has developed a number of special farm products such as weed killers and asphalt specialties to supplement its line of fuels and lubricants. The 25,000 b/d refinery manufactures some 70-odd individual products, most of which have agricultural applications. In its sales promotion, the company tries to identify itself with the farmer as a local enterprise interested in the success of the grower.

As demand for oil has grown in the near-by trade territory, Lion has expanded its refinery. A new Type IV fluid cat cracker and a sulfuric acid alkylation plant were built recently.

In the producing field, Lion has sought to bring its crude output up to the level of refinery runs. Currently, company crude output is about 21,000 b/d, or 83 percent of requirements. Proration has tended to keep crude output well below well capacity.

Progress in refinement of the nitrate fixation process in the years since World War II is seen in nearly every step at the new Barton plant. First impression is in the greater compactness of the Louisiana installation. This has been accomplished in an important measure by the use of centrifugal compressors where applicable and of very large reciprocating compressor units for the final compression build-up through five stages to 5,200 psig.

At El Dorado the vast compressor building houses 71,000 horsepower, largely in units of about 1,000 hp each. For the six-stage compression step required for ammonia synthesis, 14 units of 1,100 hp and 15 of 1,000 hp are employed at El Dorado, whereas at Luling six 2,500 hp Cooper Bessemers perform the same step.

One compression stage is eliminated at New Orleans by using pressure reforming, thus making an important saving in horsepower.

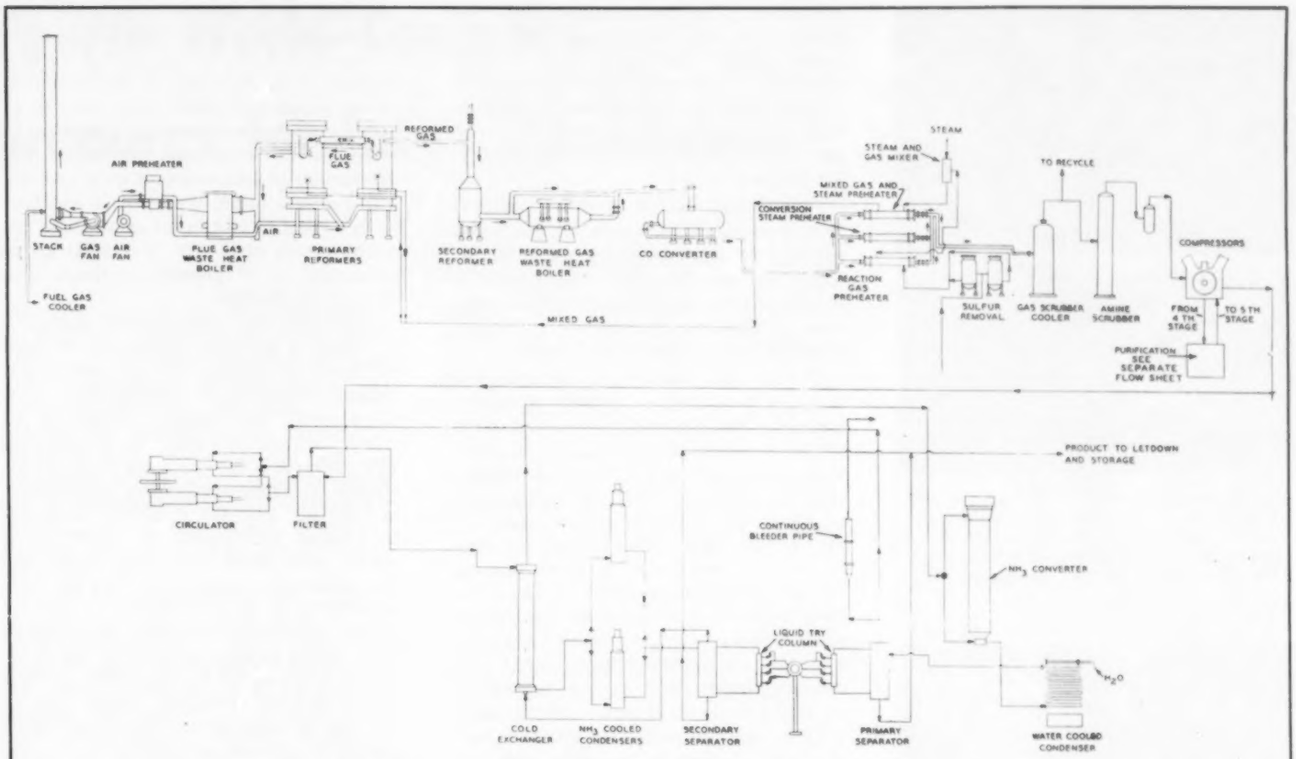
In another section of the New Orleans plant, refrigeration is obtained by two 2,500 hp Worthington centrifugal compressor units, whereas at El Dorado seven 1,000 hp reciprocating refrigeration machines are required with, of course, much more floor space. The Louisiana nitric acid plant is equipped with two mammoth 6,800 hp Worthington centrifugals.

Elimination of many smaller individual units has simplified maintenance problems and reduced manpower requirements. Progress in instrumentation also has helped keep down the number of men employed per ton of product. Employees at Luling total 400 to produce 300 tons per day compared with 1,000 at El Dorado to produce 570 tons per day.

Important changes have been made in the design of reformer furnaces to improve the rate of conversion per unit. Synthesis gas purification technique improvements have cut operating costs.

Principal steps in the manufacturing process may be followed in the series of simplified flow diagrams shown herewith. The Texas Co. supplies 20 million cubic feet of 1,000 Btu sweet natural gas per day under a long term contract for plant fuel and raw material. Process gas is treated at the rate of 5,000 cubic feet per minute for removal of any traces of sulfur, preheated to 750°F and mixed with steam before charging to primary reformer furnaces at 40 psig. The reformers are vertical, cylindrical furnaces containing 20 stainless steel reactor tubes charged with nickel oxide catalyst. The reactor tubes installed in parallel in two vertical planes at right angles are externally fired. Flue gas leaves the furnaces at 1,600°F and process gas at 1,200°F.

Effect of the reaction is to convert the



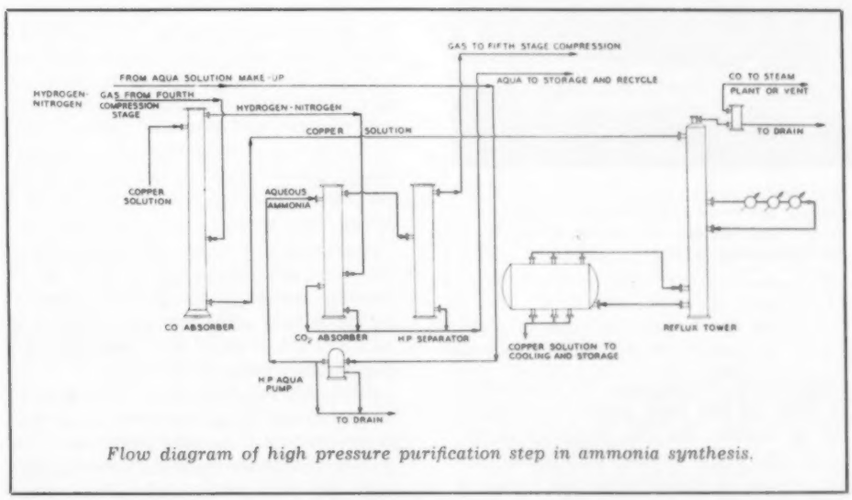
Flow diagram of ammonia synthesis section of Lion Oil Company's new Barton plant.

mixed steam and methane to carbon monoxide and hydrogen. Conversion of the natural gas is approximately 95 percent completed in the primary reformer.

The 1,600° flue gases from the primary reformer are employed to preheat air for furnaces and to produce 175-pound process steam.

Reformed gas from the primary reactors is mixed with preheated air and flue gas from the primary reformers and passed through a secondary reformer containing a single catalyst bed. Methane content of the reformed gas is reduced to about 0.4 percent in the secondary reformer which operates at about 1,600°F. Ratio of air and gas charged to the secondary reformer is carefully controlled to produce exact volumes of hydrogen and nitrogen required in the later ammonia synthesis. Total volume of mixed air and flue gas charged is 8,000 cubic feet per minute. All the oxygen in the air is removed in the reformer by burning the hydrogen. The nitrogen concentration is increased.

Reformed gas is cooled to 800°F in a second waste heat boiler and mixed with 40-pound steam preheated to 600°F before charging to a converter where a major part of the carbon monoxide is converted to carbon dioxide and hydrogen, following the equation $CO + H_2O = CO_2 + H_2$. Mixed gas leaving the CO converter has approximately the following analysis:

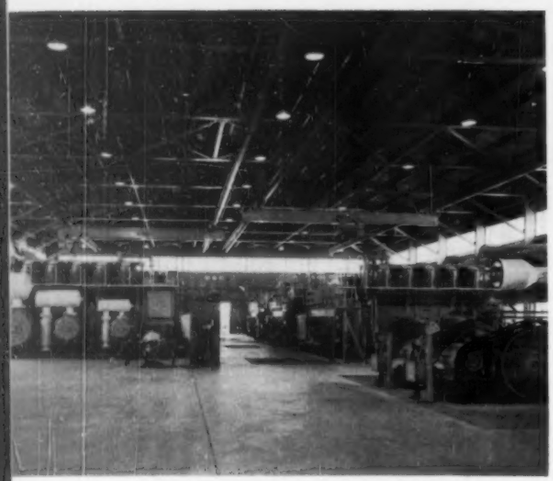


Flow diagram of high pressure purification step in ammonia synthesis.

Hydrogen	60%
Nitrogen	20%
Carbon Dioxide	18%
Carbon Monoxide	2%
Methane	Trace
Argon	Trace

Mixed process gases from the CO converter are scrubbed with water, cooled to 85°F and passed at the rate of 14,000 cubic feet per minute through a Girbotol unit charged with a 20 percent aqueous solution of monoethanolamine for carbon dioxide removal. Circulation of MEA solution is at the rate of 1,000 gpm at 20 psig, reducing CO content to about 0.2 percent.

Improvements in the MEA treating step at Luling have been instrumental in elim-



Gas engine compressor building housing six 2,500 hp multi-stage compressors, used to compress synthesis gas for the various processing steps, and two 2,500 hp centrifugals for refrigeration.

The boiler plant consists of three 125,000-pound per hour high pressure boilers which supplement the steam produced by waste heat boilers.

inating loss of hydrogen and a reduction in load on the high stage compressors. At El Dorado the CO_2 scrubber is followed by eight washes with water and six stages of compression are required. At Luling CO_2 is reduced to 5 ppm or less before compression so that little CO_2 must pass through the compressors.

Mixed process gases from the CO_2 scrubber are compressed from 15 to 1,800 psig in four stages employing a battery of six 2,500 hp Cooper Bessemer gas engine driven compressors. At this stage the gases are subjected to high pressure purification in two steps to avoid poisoning catalyst in the ammonia converter and to prevent plugging lines with ammonium carbonate. The gas is divided into two trains, each of which is scrubbed with a copper liquor. The copper liquor reduces CO content to five to ten parts per million. Copper liquor is regenerated by pressure reduction and heating, after which it must be refrigerated before being returned to the column.

Second step in high pressure purification is to wash the gases with a weak solution of aqua ammonia in a bubble tower cutting CO_2 from 50-60 ppm to 5 ppm or less. At Luling two high pressure purification columns are employed, compared with seven at El Dorado.

The purified mixture of hydrogen and nitrogen is filtered to remove oil traces, passes to the fifth compression stage, from which it passes after cooling to the ammonia converter at 5,200 psi. Conversion over the promoted ferric oxide catalyst is at about 400°F following the equation: $3H_2 + N_2 = 2NH_3$. About 15 percent ammonia is formed per pass. Gases leaving the converter are cooled to condense the NH_3, which is removed from the recycle gases in two separators arranged in series. A continuous bleeder pipe from the primary separator vents part of the gas to prevent a build-up of inerts and methane. Ammonia is let down to 250 psig and passed to storage, to the nitric acid unit or to the ammonium nitrate pelleting towers. In order to maintain proper operating pressures in the ammonia converter, a portion of the recycle gas is removed from the primary separator and recompressed to 5,200 psig in a circulating compressor. Product condensers are cooled with ammonia which is liquefied for the refrigeration step by two 2,500 hp Worthington centrifugal compressors operating a 9,140 rpm. The compressors are driven by steam turbines at 600-pound inlet pressure and 40-pound exhaust. Cold exchangers plus the ammonia condensers reduce the temperature of the raw mixed gas stream and the recycle gas to 32°F before conversion.

Ammonia converters at Luling are of the same general design as those at El Dorado, but of much greater capacity. At the Barton plant two converters produce 300 t/d while at El Dorado nine are required to produce 570 t/d.

Favorable location of the Barton plant has permitted Lion to dispose of part of its by-product CO_2 under contract.

Carbon dioxide effluent from the Girbotol unit at 6 psig and 140°F is cooled to 93°F with water and scrubbed with potassium permanganate to remove possible odor or contaminants. Subsequently the stream is liquefied and part is shipped in bottles and tank cars for charging fire extinguishers, carbonation and other purposes. Another part is flashed to gas and snow. The gas is recycled and the snow compressed into 55-pound cakes at 2,200 psig. The dry ice is wrapped in paper and shipped in special insulated cars to various refrigeration stations. Capacity of the carbon dioxide plant is 42 tons per day.

Although a growing volume of ammonia is applied directly to the soil during cultivation, it is necessary to convert most of the product to solid form for sale as fertilizer. This requires the oxidation of ammonia to nitric acid to permit the production of ammonium nitrate. At the 460 t/d acid plant, ammonia is oxidized in two steps to NO_2 in an exothermic reaction taking place over a catalyst gauze consisting of 90 percent platinum and 10 percent rhodium.

Air supply for oxidizing the ammonia is supplied by two mammoth 2-stage Worthington turbine-driven centrifugal compressors rated at 6,800 hp each. The compressors are directly connected to steam turbines operating on 600-pound, 750° steam at 5,600 rpm. Air for the conversion is compressed from atmosphere to 115 psig and 450°F before catalysis. Exit gases are cooled to 285°F in a waste heat boiler for steam recovery and absorbed in water following the formula $3NO_2 + H_2O = 2HNO_3 + NO +$ 27,600 cal. Liquid recovered in condensers is 40-45 percent nitric acid, which is bleached to remove nitrous acid and other dissolved acid. Finished nitric acid is pumped to storage for subsequent production of ammonium nitrate.

The Chemical Construction Corp. designed acid plant is larger and more compact than the El Dorado installation where two units are required.

Ammonium nitrate pelleting operations are conducted at towers located over a mile distant from the ammonia and nitric acid units. Steam, water, nitric acid and ammonia are all piped through a mile and a half long system of lines to the prilling plant. The distant location was selected to reduce insurance charges at the suggestion of underwriters although there has never been an explosion at an ammonium nitrate manufacturing plant. The disastrous Texas City explosion has been attributed to fire fighting methods employed on the ship which exploded.

The nitrate plant is dominated by two 200-foot towers in which liquid ammonium nitrate concentrated to 96 percent purity is sprayed downward against a stream of conditioned air. As the NH_4O_3 drops, it solidifies into small pellets which are subsequently dried, coated with diatomaceous earth and packed in moisture-proof bags.

Engineering contractor for the Barton fertilizer plant was Chemical Construction Corp. The Lummus Co. was building contractor. Construction was completed in 18 months and operations began in May.

At the recent dedication ceremonies, Chairman Barton stated that Lion had purchased large excess acreage for possible future expansion. There is an immediate proposal to erect a unit for the preparation of nitrogen liquids for sale to manufacturers of mixed fertilizers.

Fourth World Congress prepares for large attendance

Prof. Marcello Boldrini, chairman of AGIP and of the General Organizing Committee of the Fourth World Petroleum Congress.

Dr. Arturo A. Muston, secretary of the Fourth World Petroleum Congress.

PLANS FOR THE Fourth World Petroleum Congress are rapidly maturing under direction of the General Organizing Committee representing all branches of the Italian hydrocarbon industries. Up to mid-October, more than one hundred of the papers to be presented had been received by the Technical Committee which has its headquarters in Milan under the chairmanship of Prof. Carlo Padovani, director of the Stazione Sperimentale Per i Combustibili.

The work of general revision and of preparing translations of synopses is progressing satisfactorily. Some papers are already in type, but there is much work to be done in arranging tracing and drawings to be uniform in presentation and of the highest standard as the Technical Committee considers this of utmost importance to a clear understanding. In some cases it is necessary to have charts and illustrations entirely redrawn at the expense of the committee.

The timetable of the technical sessions of the Congress has been carefully laid out. It provides for practically continuous use of the seven largest rooms in the Palazzo dei Congressi during the period of the meeting. Only in the case of two sections, which have more than the average number of papers to consider, has it been necessary to divide the section into two groups meeting simultaneously.

In arranging the technical program, the purpose has been to allow as much time as possible for the discussion of papers. With this objective in view, each author has been allotted 15 minutes for outlining the highlights of his paper while 30 minutes is assigned to discussion. The schedules allow for a half hour suspension of readings and discussions in mid-morning of each day to permit informal contacts among the delegates or to enable them to obtain coffee or other light refreshments in the cafeteria. Since preprints of the papers will be circulated among the delegates in advance of their formal consideration, the time periods allowed for presentation are considered adequate and it will be the purpose of those in charge of the meetings to put the proceedings through at a business-like pace in accordance with the time limits established.

The general organizing Committee of the Congress has as its chairman Prof. Marcello Boldrini, chairman of AGIP, with Dr. Vincenzo Cassaniga, managing director of Esso Standard Italiana, Dr. Gaetano d'Amilio, chairman of Unione Petrolifera, and Prof. Filippo Pennavaria, chairman of STOI, as vice chairmen and Dr. Arturo A. Muston, Esso Standard executive, as secretary and coordinator of activities. Through its several subcommittees, the various activities connected with the formal proceedings of the Congress and the not less important matters of housing, transportation, information and entertainment are receiving careful attention.

For the convenience of those attending the sessions of the Congress, which are to be held in the convention hall of the Universal Exhibition in the Citta Parco, a short distance outside the city, the committee will operate a special omnibus line to the EUR with buses at frequent intervals. The new subway line connecting the terminal railway station with EUR will be in operation at the time of the Congress.

The inaugural session of the Congress will be held at the Capitoline Palace in the city, but other formal meetings will be held at EUR, including the four plenary addresses which, with their speakers, are timed as follows:

Wednesday, June 8—C.A.P. Southwell, chairman of Kuwait Oil Co. Ltd. and former president of the Institute of Petroleum, London, "New Developments in Oil."

Friday, June 10—Prof. J. Ch. Jungers, University of Louvain, Belgium, "Kinetics of Petrochemical Practices."

Monday, June 13—Prof. W. K. Lewis, Massachusetts Institute of Technology, U.S.A., "Energy Resources."

Tuesday, June 14—An article by an Italian authority, title of which is yet to be determined.

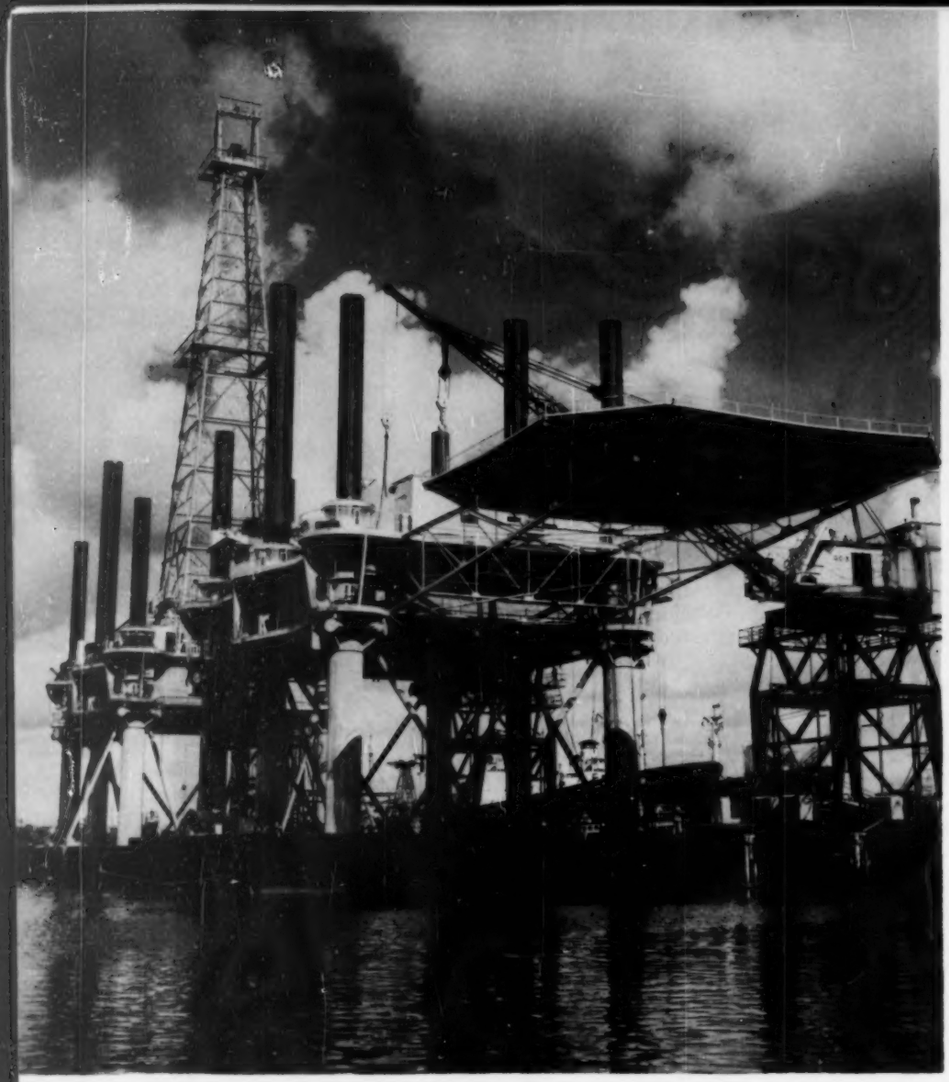
It should be noted that the above titles are merely tentative. The exact titles of the papers when presented will be determined by their authors.

While the Congress is being organized as a working body and its activities will be devoted mainly to the consideration of technical and industrial matters, it will not be in any respect devoid of recreation. In addition to the official dinners and receptions, there will be dancing and theatrical entertainment in the evenings. A special committee is arranging art tours and visits to galleries, museums and other points of interest for the ladies attending the meeting.

Thursday, June 9 is a holiday in Italy and no formal meetings will be held on that day or on the following Saturday and Sunday. Instead, these days will be devoted to sightseeing tours about Rome. On the evening of June 9 a special operatic performance will be given for delegates and visitors.

Following the conclusion of the regular sessions of the Congress those attending it will have the opportunity of taking one of several trips to other parts of Italy, including visits to important industrial establishments or to places of historic or scenic interest. Details of these tours are described in an attractive brochure issued by the central organization and available through the various national committees.

From advance reports it appears certain that attendance at the Fourth Congress will exceed that at any of the preceding meetings. Reservations in hand indicate that a large number of visitors will be present from France, Germany, the United Kingdom and South America. Applications from the United States up to October were above 250. Estimates are that at least double that number of Americans will be in Rome by June and that probably 3,000 to 4,000 members of the oil industry will be present when the Congress convenes.



Mister

"Mr. Gus," the twin-platform offshore drilling rig built by Bethlehem Steel Corporation's shipbuilding division at Beaumont, Tex., which was christened November 1, is shown here in 23 feet of water with her 140-foot steel derrick rearing skyward above the steel pilings which serve as giant spuds to keep the structure moored in her drilling location. This view is taken from the after end of the service platform with the heliport in the foreground. The service platform is 94 by 80 by 15 feet while the drilling platform is 106 by 80 by 15. The two platforms are joined by a steel bridge.

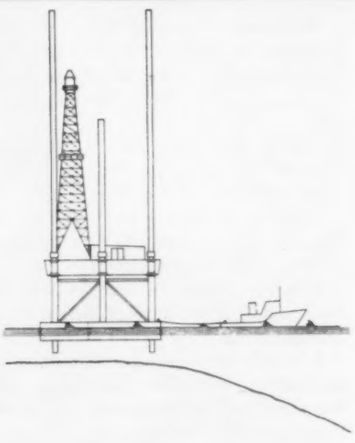


Fig. 1. Drilling platform being towed to location. Drilling and service platforms are towed to location separately.

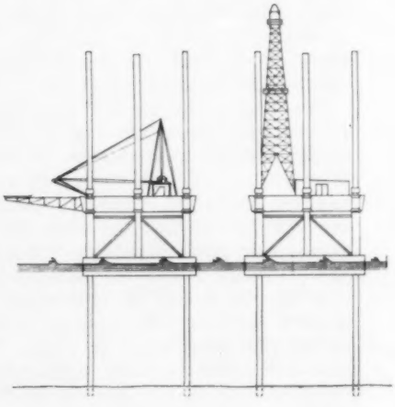


Fig. 2. First stage of installation: The platforms are positioned on location and the piles are dropped into the ocean floor.

PROPOSED METHOD FOR OPERATING BETHLEHEM TWIN-HULL MOBILE PLATFORM

Gus goes to sea . . .

By James W. Calvert

"MR. GUS," Bethlehem Steel Company's long-awaited offshore drilling platform and the only one thus far completed that is designed to drill in water up to 100 feet in depth, was christened November 1 at Bethlehem's shipbuilding division in Beaumont and the next day left for its first assignment in the fabulous offshore fields of the Gulf of Mexico.

C. G. Glasscock of Corpus Christi, Texas independent and president of the C. G. Glasscock Drilling Co. which will operate the steel giant, said "Mr. Gus" would move to a location for Shell Oil Co. off San Luis Pass near Freeport, Texas to drill for oil in 65 feet of water.

Meanwhile, Bethlehem officials said they had plans on the drawing board for a new and even larger design which could work in 200-foot depths.

"Mr. Gus," which actually is two separate structures, has been in the planning stage since 1948 when drilling for oil in the waters of the Gulf of Mexico off the Texas and Louisiana coast first became a reality. Preliminary ideas were discussed at a conference in Corsicana, Texas, in February of that year between representatives of Bethlehem Steel Co., shipbuilding division, and Bethlehem Supply Co., one of the leading manufacturers of oilfield machinery.

Engineers developed a plan for lifting a drilling barge by pushing down on four huge "super spuds" which would penetrate the floor of the ocean. Many alternate plans, modifications, improvements, and designs have since gone into the development of the platform, but basically the idea is the same.

The Bethlehem design utilized the three known methods of support for a platform at sea: buoyancy, pile support and bottom support, thus distributing the total load in any desired proportion. This makes it possible to change the support if conditions are changed by such natural phenomena as scouring of the bottom or the sinking of piling.

The mobile platform consists of four principal parts. A buoyant foundation supports a working platform and the two are connected by steel piling. The fourth part is a hydraulic connection between the platform and the pile.

The foundation is a large steel structure, or barge, of 2,000-ton displacement which acts as a floating support for the entire weight. The foundation contains ballast tanks which are flooded with sea water to sink it to the floor of the ocean. In the foundation also are tanks for fresh water and fuel, and water-tight pump rooms containing the necessary machinery for pumping ballast. Four pile tubes, heavily braced, support the working platform in the towing position. There are also two access tubes which are built into the foundation and extend up through the working platform.

While afloat, the structure has four 280-foot steel piles projecting upward from the four corners, and two shorter piles projecting upward from the access tubes. There are two sets of clamps on each corner pile, about 50 feet apart. The piles

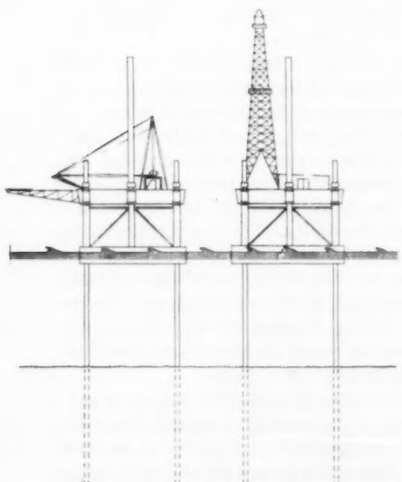


Fig. 3. Second stage of installation: The piles are forced into the subsoil by applying through the jacks the weight of each platform deck with equipment to two diagonally opposite piles at a time until desired penetration is obtained.

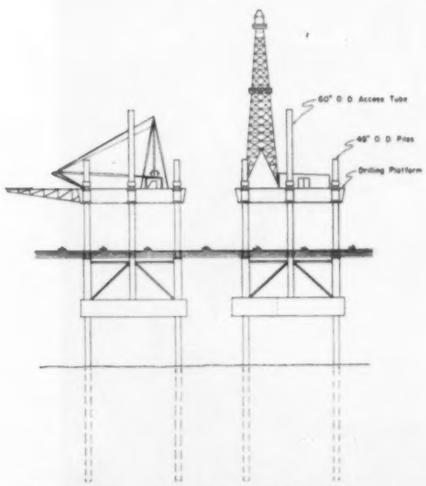


Fig. 4. Third stage of installation: The platform decks are then clamped onto the piles, and the barge foundations with template tubes are flooded and submerged to the ocean floor, transferring the support of the decks from the hull to the piles. During the transfer, shock loading on the piles due to wave action on the hulls is dampened by hydraulic shock absorbers in the jacks.

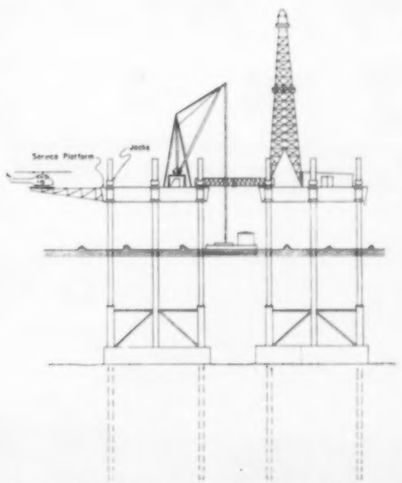


Fig. 5. Completed installation: (1) The hulls are pressed firmly against ocean floor by the jacks on the access tubes. (2) Men go down the access tubes and remotely clamp the hulls and template tubes to the piles. Foundations contain storage for fuel and rig water, a submarine room for ballast and auxiliary pumps, and remote controls for pile clamps.

This view from the upper deck level of the dual structure shows the service platform in the foreground with the drilling platform in the background.

are 48-inch cylindrical hollow steel tubing of 1¼-inch wall pipe for the bottom 160 feet and 1-inch wall pipe for the top 120 feet.

The device which accomplished the purpose of the design, to drive the piling into the ground, is a Bethlehem-designed hydraulic connection or jack whose basic principle is a slip similar to that used on a drilling rig to support drilling stems.

The slips are wedge-shaped and have one face roughened to develop friction and the other smooth to facilitate movement in the cone-shaped supports. The hydraulic apparatus is actuated by two cylinders which can push the pile downward with a force of 827 tons and can pull upward with a force of 942 tons.

When the platform is on location, the piles are lowered and driven into the ground by the hydraulic jacks. They are driven two at a time in diagonally opposite corners. When the entire weight of the structure is supported on any two of the piles, the apparatus takes hold of all four piles and the foundation is then submerged, literally sliding down the piles as it sinks to the ocean floor.

Once on the bottom and out of the wave action of the sea, the foundation is clamped into place by men who enter through the access tubes. These clamps provide additional underwater bracing.

The jacks are electrically-driven Vickers hydraulic cylinders and force the piles downward or extract them at the rate of about one foot per minute in a series of five-foot strokes.

The piles can be driven to a penetration of 100 feet into the ground in 100 feet of water and the derrick floor will be 60 feet above the surface of the water. Engineers say the structure can withstand hurricane winds up to 125 miles per hour with safety.

The designers believe that in normal operating conditions the structure can be moved to a new location in 12 hours.

"Mr. Gus" consists of a drilling platform and a service platform and the two are connected by a steel bridge. The structure was built in two parts for greater flexibility. The service platform, for example, could be used instead of a tender for a permanent drilling rig, while the drilling platform could equally be used with a floating tender. Bethlehem officials say their proposed new platform will be a single structure.

The drilling platform has standard machinery arrangement although the all-diesel equipment is of the most modern type. The main power plant on the drilling deck level on the forward end of the platform consists of four GM diesel quads, each engine developing 500 hp for a maximum horsepower of 3,200 at 1,850 rpm and a continuous horsepower of 2,080 at 1,600 rpm. The power feeds into a National Type B compound with a Type 315 gear and fluid drive which operates the drawworks, rotary table and mud pumps.

The National 130 drawworks has a rated input horsepower of 1,300 and six hoisting speeds, with a depth range of 10,000 to 16,000 feet. The drum is 56¼ inches long and has a 30-inch diameter.

On the lower deck, and directly below the main engine room, are the active mud pit with 310 barrels capacity at 6-foot depth, and the pump room which contains three National E-500 mud pumps with maximum working pressure of 3,500 psi. One of the pumps is a stand-by. A synchronizing device controlled from the driller's console makes it possible to operate two pumps in perfect synchronization.

Blowout preventers, a Hydril unit and shale shaker are located just abaft the pump room on the lower deck level.

One feature of the unit is the method of transferring mud from the reserve storage in the service platform to the drilling platform's active pits. A 3-inch jet line picks up dry mud in the service patform and jets it back to the active pits through a 5-inch line.

In the service platform superstructure are storage facilities for 2,450 sacks of dry mud, which are lifted from a conveyer into a hopper by means of a Southwestern Supply and Machine Works Rath lift and thus fed into the jet line for transmission to the drilling platform.

In the service platform also are a Halliburton cement unit, electric galley, air-conditioned living quarters for a crew of 31, recreation room and various storage facilities. The forward end of the main deck has pipe racks with 2,000 square feet of storage space. Pipe is carried across the bridge to the drilling barge by means of a roller conveyer. On the after end of the service platform is a heliport. On top of the service platform housing is a 35-ton stiff leg derrick with a 70-foot radius and a 6-ton crane for landing personnel and small cargoes.

Electric power for the rig is supplied by four 150 kw, 440 volt, three phase, 60 cycle AC generators. There are two such units on each platform, each powered with twin GM series 671 diesel engines. These generators supply power for the hydraulic jacks as well as for operating conveyors and miscellaneous small motors.

Two tenders have been assigned to "Mr. Gus." One is "Barbara Storm," an all-steel dieselized work boat 130 by 30 by 10 feet, also built by Bethlehem for general utility work such as light towing and hauling fuel, water, mud, pipe and other drilling supplies. The tender, which has a capacity of 475 tons, is powered with two sets of GM series 671 quads developing a total of 1,040 hp at 1,600 rpm. The engines swing twin screws 60 by 72 inches and can drive the tender along at a speed of 12.5 miles per hour. Sperry pilot-house controls and steering mechanism assure ease in handling the craft.

The second tender, a dieselized sea-going tug which will double as a crew boat, is "Gus III."

In the official ceremony christening the giant drilling platform, E. C. Rechtin (center), general manager of the Bethlehem shipyard at Beaumont, presents C. G. Glasscock of Corpus Christi, Texas, with completion papers of the drilling rig and tender. Mrs. Glasscock, sponsor of "Mr. Gus," watches the presentation.

Several years of intense research went into the final plans for the Bethlehem platform. A hurricane in 1949 which destroyed one platform in the Gulf of Mexico and damaged several others resulted in a broad research program which involved studies by Gulf Research Corp., the University of Michigan, Stevens Institute of Hoboken, N.J., Texas A & M College, Greer & McClelland of Houston, Texas, and the research staffs of Gulf Oil and Bethlehem Steel.

However, the first oil man to recognize the advantage and flexibility of the Bethlehem dual platform as a contractor's tool was C. G. Glasscock, known to the oil industry as "Mr. Gus." Mr. Glasscock began his career in the Burkburnett field in 1919. His first job was as carpenter's helper in the building of an oil derrick.

He has operated in all parts of Texas and in the shallow waters of Corpus Christi Bay, but this will be his first venture in the deep water of the Gulf of Mexico. During the past few years the seven shallow water drilling barges of the C. G. Glasscock Drilling Co., all of which were built at the Bethlehem yard, have drilled more than 200 oil wells in the Texas bay area.

Mr. Glasscock has drilled only one well in Louisiana, a 14,000-foot hole for Atlantic Oil Producing Co. in the marshes south of Morgan City.

"This is the only barge I have seen that would come near to drilling in 100 feet of water," said "Mr. Gus" in an interview at the christening of his new platform, "and I can't see any reason to get anything any smaller than that."

Are oil imports responsible for coal's problems?

By Walter J. Levy*

NOT FOR THE FIRST TIME, but with more vigor than ever, the coal industry has requested the government to take steps to halt the decline in its markets. For this purpose it has proposed that the government enact a variety of restrictions on the use of competing fuels and take extraordinary measures on its behalf.

There is no doubt that coal at present is a severely depressed industry. The current rate of bituminous coal output, less than 370 million tons, is the lowest since 1938; it is 42 percent under the level of 1947, the peak postwar year. In the case of anthracite, production at present is the lowest since 1878. The average number of men employed at bituminous coal mines in 1953 had sunk by 142,000 from its postwar high, equivalent to a drop of one-third in the total labor force of the industry. As a result there is great suffering in many coal mining areas of the country.

The decline of the coal industry is not a sudden development, but the continuation of a trend which began as long ago as the first World War. Since then the downward movement has been interrupted only by World War II and the abnormal conditions prevailing in the early post-war years. The decline occurred during a period when the total national output more than tripled while the quantity of energy used nearly doubled. The contribution of coal to the total energy supply of the nation has thus fallen sharply. Last year it was less than one-third compared with about 80 percent at the end of World War I. By contrast, the share of oil over the past 35 years has increased from 10 percent to over 40 percent, while that of natural gas climbed from a mere four percent to 23 percent.

The distressed condition of coal poses a serious national problem that calls for a considered approach, as the economic health of an entire industry is involved. The government, fully aware of the serious problem, has set up committees on the cabinet level to review the position of the coal industry in particular and the whole range of problems related to a national fuels policy in general.

*From an address before the Empire State Petroleum Association, Oct. 12, 1954.

To understand the present situation, it is essential to discuss briefly the reasons for the long-term decline of the coal industry. Against this background it will then be possible to review critically the validity of the various reasons for the restrictive measures that have been proposed.

What accounts for the decline in the coal industry's markets? There is perhaps one answer which explains most, if not all, of the loss. That is the inability of the coal industry, for one reason or another, to take adequate advantage of recent technological progress which has brought about tremendous changes in the supply, scope and composition of the nation's energy requirements.

Looking at the main categories of energy users, there has been, first of all, a tremendous growth in transportation. The bulk of the energy requirements there consists of liquid fuels for use in internal combustion engines, which account today for close to 20 percent of the nation's total energy needs. This market, in recent years, was never a potential outlet for coal in its solid form. In shipping, coal was displaced as a fuel several decades ago, reflecting the advantages in convenience of handling and cleanliness that liquid fuels enjoy over solid fuels. In railroads, both coal and, in some areas of the country, residual fuel oil have been used extensively as under-boiler fuels. Both, however, are rapidly being displaced by diesel oil which, because of its greater thermal efficiency, offers great savings.

The losses suffered in this one market alone, some 82 million tons since 1947, account for over two-thirds of the total decline in coal consumption from the postwar peak. Unless dramatic new technological developments occur, this market will be irretrievably lost to coal.

Turning to the trend of coal consumption in stationary installations, there has been a drop in sales in two major categories: manufacturing and retail outlets. Excluding specific uses such as coking, which is virtually an exclusive coal market, consumption of coal by industrial users last year was 33 million tons below the postwar high. However, residual fuel

oil, even though its sales rose somewhat during the period, also lost ground relative to other fuels, particularly natural gas. Similarly, in heating, where coal consumption last year was 38 million tons below 1947, the principal competing fuels have been distillates and natural gas, which offer decisive advantages over coal in convenience, cleanliness, heat control and efficiency.

Finally, there are electric power plants which comprise virtually the only user category with extensive facilities to change readily from coal to fuel oil, and vice versa. The technological advantages of liquid over solid fuels are perhaps of least significance for these users, and their relative purchases of coal and oil depend largely on commercial considerations. It is noteworthy that coal consumption by electric utilities has risen rapidly in recent years. In fact, the increase has been much greater than that in fuel oil use; coal sales between 1947 and 1953 advanced 26 million tons, while fuel oil sales increased only nine million tons in terms of heat equivalent.

The case of electric power plants illustrates that the dramatic losses in coal sales have taken place largely in uses where radical technical changes have occurred, as in the development of diesel engines for railroads or of efficient and convenient oil and gas burners for homes. In any case, it is not primarily residual fuel oil, but other hydrocarbons which have taken over coal's markets. As a matter of fact, residual fuel oil consumption has also lagged behind the increase in the nation's total energy requirements. Its growth between 1947 and 1953 amounted to 8.5 percent, compared with an advance in the total of nearly 10 percent.

It might be noted that the oil industry has not asked the government to protect its fuel oil market by restricting the consumer in the free choice of the fuel that is most efficient and economical for his particular needs. Instead, the oil industry is exerting every effort to adjust its operations in such a manner that it can provide the new fuels in the quantities and qualities that the customer desires while continuing to supply residual fuel oil to the markets which still call for that product. Of the total oil requirements of the United States, residual fuel oil in 1953 accounted for only 20 percent, compared with 26 percent in 1947. At the same time, domestic refiners were successful in reducing their fuel oil yield from 24 percent to less than 18 percent. Caribbean fuel oil, which is obtained from the large production of heavy crude in Venezuela, has made up the difference. However, because of the relatively slow rate of advance in United States fuel oil requirements, imports of that product have shown minor increases in the past three years.

In contrast to the progressive adaptation to changing requirements and techniques undertaken by the oil industry, the coal industry has asked the government to initiate measures that would either involve assistance in direct form or result in reducing the availability of competing fuels. The measures in direct support of coal include government aid in the sale of coal in overseas markets, reductions in freight rates on coal shipments and the use of coal in government buildings and installations, both in the United States and overseas, where it is available, regardless of cost or other considerations. In addition, the coal industry proposes that consideration should be given to requiring the use of coal, where feasible, by the recipients of government loans and that rapid tax amortization to industrial plants might be granted upon agreement to use coal whenever possible.

So far as measures against competing fuels are concerned, the coal industry proposes that the government raise the price of natural gas, limit its use under boilers, restrict imports of both natural gas and fuel oil, and discourage the output of fuel oil in Caribbean refineries. Moreover, the program is not confined to fuels which presently compete with coal. It even includes a proposal for the cessation of government spending to develop commercial steam plants fueled by atomic energy, on the ground that it would be "a travesty if the coal industry is now deprived of such markets as a result of government-sponsored research and development."

This is indeed a far-reaching and drastic program. So far as residual fuel oil is concerned, the severe limitations on imports which the coal interests propose either would deprive many consumers outright of the most efficient fuel which their equipment can use or would make fuel oil so expensive that it could in fact not be purchased economically. It is noteworthy that for its own sales the coal industry has requested the government to obtain the removal of import obstacles in Europe. To justify the restrictive measures against fuel oil imports, the coal industry, therefore, cites specific reasons: the most important of these are that the production of fuel oil abroad involves an inefficient use of crude oil, that fuel oil is dumped on American shores and that it represents an insecure source of supply during an emergency.

The coal industry states that refining in the Caribbean is inefficient because refineries there produce about 60 percent residual fuel oil, compared with an average of 18 percent in the United States. Accordingly, the coal industry suggests that refinery yields of light products in the Caribbean be increased through new investment stimulated by government guarantees, and that imports of residual fuel into the United States should be reduced while shipments of light products would be increased somewhat.

What is completely ignored in this proposal is that the Venezuelan crude oil typically refined in the Caribbean is much heavier than United States crude and yields a very large proportion of heavy fuel; such an output pattern is in accordance with the current demand for Caribbean products as it has commercially developed.

Without going further into the implications of these proposals for the oil industry, it is clear that their major goal and result would be a reduction in United States fuel oil imports to a very low level. If domestic refineries should try to make up even a small part of the ensuing gap, they would have to process additional quantities of domestic crudes, resulting in an oversupply of light products. At the same time, increasing quantities of these products would be imported under the coal industry's proposals. Further, the price of residual fuel oil would have to be raised and it might well become too expensive for many of its pres-

ent uses. The nation would thus be burdened with an expensive substitution of coal for oil and an uneconomic utilization of the oil industry's resources and of the country's productive facilities.

The coal industry also charges that fuel oil is being "dumped" in large quantities on the American market. In support, it cites the fact that residual fuel oil is quoted below the price of crude oil. This interpretation of the crude-fuel oil price relationship reveals a fundamental misconception concerning the basic economics of crude oil and refined product pricing. It ignores the fact that petroleum refining represents a typical case of a joint output of a number of products from one raw material. Each of these products has its own market and the price of each is determined by its own supply and demand considerations. The price of crude oil, as well as refining costs and profit, must of course be recovered from the value of the total output. If, for instance, the refining of a particular crude yields only residual fuel oil, the price of the crude would in general be lower than the fuel oil price since the cost and profit of refining would have to be covered entirely by the return on fuel oil sales. If, on the other hand, a substantial part of the refiner's output consists of high-value lighter products, the crude oil price very likely will be above the price of fuel oil. It cannot logically be said, therefore, that fuel oil is sold below the value of the crude from which it is derived, if the latter is in fact based on the proportion of fuel oil which it yields.

Regarding this point, I may perhaps refer to some work I have done as economic consultant to Venezuela on the subject of the valuation of heavy crude oils. The conclusion reached was that for low gravity crudes there exists a close relationship between crude oil values and fuel oil prices. This, by the way, is confirmed by the market behavior of heavy crude oils in the United States, particularly in California, where there is a large production of such crudes.

From the point of view of general economic principles, therefore, the coal industry has not made a convincing case against fuel oil imports. As long as the country draws its strength from the tenets of being in the forefront of technical progress, sponsoring freedom of enterprise and limiting government-imposed restrictions to a minimum, its industry must be free to make use of the most efficient productive resources available.

There is, however, one further range of consideration which must necessarily affect the national energy policy; that is the country's security. Coal spokesmen have charged that the importation of residual fuel oil in large quantities is undermining the strength of their industry, whose ability to supply greatly increased quantities is essential to the nation in time of war. By contrast, so the coal advocates contend, imported oil represents an unreliable supply largely for the reason that the tanker movement of oil can be interrupted by the action of enemy submarines. According to this argument, it is essential that the United States place maximum reliance on the use of coal in peacetime as well as during emergencies.

To assess the true import of this charge, it may be worth while to consider briefly the role of coal and oil in World War II. During that war the demand for coal rose from 512 million tons in 1940 to 638 million tons in 1944, an advance of 33 percent. Residual fuel oil production of United States refineries meanwhile increased from 864,000 barrels per day in 1940 to 1,322,000 barrels daily in the first half of 1945, or 53 percent. And in the Caribbean, which provided the bulk of the oil requirements of the Allied fighting forces, the fuel oil output jumped approximately 55 percent. These figures clearly show that the maximum amount of all fuels that could possibly be made available was needed and that fuel oil supplies actually expanded relatively more rapidly than the output of coal; in fact, they rose more sharply than those of any other petroleum product except, of course, aviation gasoline for Allied air fleets.

It is safe to assume, therefore, that in any future conflict, if we think in terms of a traditional war, greatly increased quantities of both coal and fuel oil will be required. It is equally certain, and I refer to our Defense Department, that we as well as our Allies would have to depend on other friendly nations for an essential part of our oil supplies.

To take deliberate measures in peacetime which would, to all intents and purposes, exclude foreign oil from our markets, might well result in making supplies from such sources unavailable when needed most. Moreover, to take such measures in order to create an artificial peacetime prosperity for the coal industry would still not solve the problem of how to assure a large wartime expansion of available coal supplies since such an expansion would have to be above the previously existing level of output. Accordingly, restrictions on fuel oil imports, while jeopardizing vital supplies of fuel oil, would contribute little if anything toward a solution of the problem of coal supplies in emergencies.

To inject a parenthetical comment, any assumption that we cannot count on the availability of foreign oil during an emergency because we would have lost control of the seas reflects an extraordinarily pessimistic attitude. It appears, in fact, to imply that we would have no allies left, no armies overseas and that we were engaged in a last-ditch defense of our own soil.

The emergencies thus far reviewed are the kind experienced in the past, where fighting takes place with conventional weapons. However, in a future world conflict, as a recent NATO report stated, the prospects are that the attacker would attempt to knock out his victim at a very early stage, by means of atomic and hydrogen bombs, intercontinental planes and long-range guided missiles. In such a war, the first few weeks of fighting might easily prove to be decisive. During that period, we would have to rely for our fuels entirely on current production and stocks.

To determine in advance the size, scope and kind of energy needs beyond this period is scarcely possible. But it seems certain that our requirements would show very little resemblance to the pattern of past emergencies. Nevertheless, two conclusions may be drawn with reasonable certainty. First, as the National Petroleum Council has pointed out, what is required is a genius for improvisation rather than detailed advance planning, and reserves of mobile transportation rather than surplus production facilities. Secondly, a maximum diversification of supply sources would be of more vital importance than ever, and such a diversification should obviously include access to foreign as well as domestic sources of supplies.

While we are facing the uncertainties of the future with the prospect of a long drawn-out cold war and the risk of a major conflict ever present, it is essential to build up our strength both at home and abroad. We must provide as best as we can for a variety of contingencies that may threaten our existence.

Coal, it is true, is confronted with a grave crisis. But neither the coal industry nor the country would be served if we tried to improve its position by turning the clock back and making time stand still at the ultimate expense of the nation's economy and security. Rather, we must take a positive approach and, as far as possible, initiate measures to help coal keep pace with technological developments. This would require that the industry adopt modern methods of mining, find efficient means of utilizing its output and discover new ways of enhancing the value of its production. With an imaginative program, the long-range prospects for coal may not be as dim as the outlook today would seem to indicate.

In summary, it may be said that the losses of the coal industry have mainly resulted from new technological developments with which coal for one reason or another was unable to keep pace. In fact, fuel oil itself has been adversely affected by technical progress and has likewise lost ground. Further, fuel oil imports neither constitute dumping nor do they result from inefficient refining operations. Above all, the security of the nation requires access to ample supplies of energy not only from domestic sources, but equally important, from friendly nations abroad.

IRANIAN oil

begins moving again

BY A VOTE of 113 to five, with one member abstaining and 11 absent, the Iranian Majlis on October 21 confirmed the agreement between the government and a consortium of international oil companies for the resumption of operation of the Persian oil industry. The overwhelming majority by which the convention was approved was a personal triumph for Minister of Finance Ali Amini, who had been the chief negotiator for Iran and for his associates in the Zahedi government.

Prompt approval by the Senate and the affixing of the Shah's signature on October 30 cleared the way for the resumption of shipments by November 1, the date that had been set tentatively for the initiation of activity under the convention worked out during months of negotiation and finally agreed upon by representatives of Iran and of the contracting oil companies on August 5.

A half dozen tankers had gathered at offshore points prepared to take on cargoes from oil in storage. The first one loaded was the British Advocate of the British Tanker Company's fleet, which pulled away from the port station at Abadan on the last day of October with 11,500 tons of distillate fuel destined for Ceylon. The only ceremony that attended her departure was the handing of the ship's papers to her master, Capt. F. W. Mann, by Finance Minister Ali Amini in the presence of a crowd of several hundred, including Iranian officials, representatives of the consortium that thereby took over the transportation and marketing of the country's oil, refinery workers and dock laborers.

Departure of the first vessel was quickly followed by the Theliconus of Royal Dutch/Shell and the Olympic Mariner under charter to Standard Oil Co. (N.J.). Meanwhile another group of ocean going tankers were taking on crude at the port of Bandar Mashur and it was stated that 135,000 tons of crude and products would be on its way marketward by the end of the first week under the new regime.

With the inauguration of shipments, price schedules were posted by Anglo-Iranian, Shell and Esso Export Corp. naming the following prices:

Iranian light export, $1.91 per barrel for gravity 34 to 34.9 degrees API, f.o.b. Bandar Mashur; Iranian light, $1.86 per barrel for gravity 34 to 34.9 degrees API, f.o.b. Abadan; and Iran heavy, $1.67 per barrel for gravity 31 to 31.9 degrees API, f.o.b. Abadan. Prices of other grades remain unchanged.

Announcement was made from The Hague of the appointment of L. E. J. Brouwer as managing director of the two companies organized to handle the production and producing of Iranian oil. Mr. Brouwer has been director of the exploration and production divisions of Bataafsche Petroleum Mij., the producing arm of the Royal Dutch group in the East. Information as to further appointments in the organizations established by the oil consortium is promised shortly.

In London the reopening of the Iranian oil fields was characterized by Minister of State Anthony Nutting, speaking before the House of Commons, in the following words:

"We are convinced that the settlement will reconcile to the greatest possible extent the interests of all parties and will bring prosperity to all concerned, particularly to the government and people of Iran."

A reflection of the settlement has been the decision of Anglo-Iranian to change its name to British Petroleum Company Ltd., at the same time transferring from its general reserve to capital account £80,550,000 ($225,540,000) and issuing to its stockholders four shares for each one now held. The step is described by the company as being "in accordance with the growth and wealth of the company now that it has been freed from the uncertainty of the Iranian involvement."

According to a statement published in London, the other members of the consortium are to pay to Anglo-Iranian a total of approximately £24 million for their interest in the combination, plus a payment of 10 cents per U. S. barrel on crude and products exported until £180 million are paid. Under the agreement governing payments by Iran, Anglo-Iranian will receive £25 million in 10 equal annual installments.

To aid the government of Iran in meeting its commitments during the period before oil payments begin to accumulate, the Foreign Operations Administration of the United States has announced that loans and grants amounting to $127.3 million will be advanced. Of this sum, $85 million will be in the form of loans from the Export-Import Bank and the balance in the form of grants of which $15 million already has been paid. These credits are in part a continuation of the financial aid advanced by the United States during the past year and in part are intended to organize a cooperative technical and economic development program for Iran.

THE IRANIAN OIL AGREEMENT

By Howard W. Page*

IRANIAN OIL flows once again to the many markets of the Eastern Hemisphere.

For three and a quarter years the great oil industry of Iran has been almost at a standstill. It has been a period of national turmoil, a hiatus in the development of that historic country and of near disaster to both Iran and the Western world.

Iran is a far-off land. Relatively few Americans know of it except from their school history books. Yet the events there are matters of great importance to Americans just as events in Korea affected us deeply. One of the great Persian poets, Saadi, said: ". . . the body of nations is like the human body. A dislocation or sore spot in one part of the body creates pain and dislocations in other parts of the body." In spite of the distance between Tehran and Chicago, the recent events in Iran are considered worthy of discussion before this great audience.

The impasse which had been reached in Iran appeared to be absolute. However, the Zahedi government, which replaced Mossadegh, had the desire to break the impasse, if at all possible. They knew that American aid could not last forever and that in any case it did not provide sufficient revenue to develop the country and improve the living standards of the people. The governments of the western world were equally anxious to break the impasse and help Iran to help itself.

After all of the previous failures, it was difficult to know where to start. Herbert Hoover, Jr., was asked to examine the situation. He and Ambassador Loy Henderson probed the possibilities and were the catalyzers of the plan for a joint effort of the eight companies of four different nationalities.

Because of the novelty of the situation and the unorthodox means which would have to be used to solve it, none of us could see the way clearly for some time. The companies insisted, and quite rightly, that any solution involving them must be basically sound from a long-term standpoint, even if unorthodox.

In the first place, a continuation of the 1933 concession or obtaining any new concessions was out of the question. Secondly, the basis had to be that the ownership of the oil and of the physical assets must be in the hands of the Iranians. The companies, on their side, insisted that they must have full and effective management of the operations. One of the major complications in this was that formerly operations included practically all of the housing and usual municipal and private activities of a city. The extent of these activities was strange to most American oil men. For example, if an electric light bulb burned out in a home, it was the fault of the oil company. Both parties felt that the management of such operations, which we called "non-basin," should, as soon as possible, devolve entirely upon Iranians.

How to fit all these pieces together? How to handle the depreciation of assets and the installation of new facilities which we would not own? What would be the limits of responsibility and authority of the operating companies and of the National Iranian Oil Co.? How were we to set up a jointly-owned operation and yet leave each company completely and absolutely free to establish its own prices and to market its own oil without any relationship whatever to the other companies?

These were only a few of the problems which had to be thrashed out among ourselves and then negotiated with the Iranians, and altered when the negotiations indicated the need. Joint effort was required. No one person had all the solutions, or very many of them, for that matter. The solutions evolved from the discussions.

Negotiations started in April under the leadership of Orville Harden for the Consortium and Dr. Ali Amini, Minister of Finance, for the Iranian Government. It was soon clear that the thinking of the two sides was far apart. In spite of this, both sides made efforts to narrow their differences and clarify the points at issue. The thorough discussions which took place during this period were invaluable in laying the ground work for the final agreement.

When a point had been reached where no further progress could be made, the negotiating team returned to London. After a very full and detailed discussion there it was decided that under certain conditions most of the views of the Iranians could be met. Although many of the company representatives were doubtful as to reaching an acceptable agreement, they were willing to try again. They gave the negotiators reasonably wide terms of reference on most points so that full opportunity could be taken of possibilities to explore all points and meet the Iranians' problems wherever possible.

The second series of negotiations was carried on at a high pace. There were meetings practically every day and sometimes twice a day. In between meetings with the Iranians, the company representatives met to discuss points which had arisen and prepare agreed answers and proposals.

Many of you here have served on industry committees. You will recognize, I'm sure, the time and inherent difficulties involved in obtaining unanimous agreement of representatives of eight companies of four nationalities to almost any proposal.

The Iranian delegates had their problems, too. They had to find solutions which they could recommend to the Majlis with reasonable expectation of acceptance. They had to take into account the views of many Iranians both in the Government and in the opposition.

As a result, there were eight or ten periods of crisis. That is, times when we finished a meeting at a well defined impasse. Each time, however, both sides agreed to study the problem further and try to devise some alternatives. Each time we were able to do this and the contributions were by no means one-sided.

Eventually, agreement in principle was reached and an aide-memoire initialled. The companies reviewed this and agreed that a final, legal agreement should be

*Director, Standard Oil Co. (N.J.), New York, N.Y. Presented before 34th Annual Meeting, American Petroleum Institute.

prepared. Twelve company lawyers took part in this and the Iranians employed outside legal specialists to help them. Much work had to be done. For example, the aide-memoire started "Arbitration will be the sole method of settling disputes and differences which cannot be settled by conciliation, with disputes primarily of a technical or accountancy character being the subject of special treatment." This subject required six pages in the final agreement, every word of which was discussed at length with Iran's specialist legal advisor.

Great care was taken by both sides that the final agreement should clearly and correctly reflect the intent of both parties and that the Persian translation faithfully expressed the intent of the English text.

The agreement was signed and immediately presented to the Majlis. A committee of 18 members each from the Majlis and Senate spent 74 hours in its detailed consideration where every word was reviewed and Dr. Anini asked for explanation and clarification.

I doubt if any agreement involved so many man hours of work and active negotiation or was as fully scrutinized by the principals of both sides. This, to my mind, is all to the good. Make-shift solutions do not last and tend to create the frictions which all of us hope to avoid in the future.

An agreement satisfactory to both sides freely negotiated and reviewed, and undertaken with a spirit of good will and respect on both sides, was essential. However, even more important is that the agreement will be carried out in the same manner. This vital task will fall upon those who will manage and work for the operating companies in Iran. They must, however, have the whole-hearted support of shareholders, who, in turn, must see that all involved are properly selected and indoctrinated. Differences of opinion are bound to occur. Willingness to understand the other point of view and patience in explanation are essential virtues to the successful operation of such ventures.

Some people seem to think that negotiations and discussions in the Middle East must be carried out in the same manner as buying a rug in the bazaar. While my own experience is limited, at least it is up-to-date. I found the opposite. I found a demand for a logical and defensible explanation of every point. Coupled with this was a willingness to accept the results when the principles and methods proposed were sound. Naturally, there is an element of trading by both sides in any agreement, and the Iranian delegation didn't miss any points that were to their advantage. However, I would not have the high respect for them which I do if it had been otherwise.

This "rug trading" view seems to lead to the opinion that every time Middle Easterners want to discuss points in their agreement, they are simply trying to chisel an unfair advantage. While chiseling is not unknown either in the Middle East or in this country, I feel that to approach problems with this assumption is dangerous. Such an attitude tends to shut out frank discussion and probing to find the true source of the difficulty. If the source is not removed, it tends to grow into an emotional reaction which no amount of logical reasoning can overcome.

The people of these countries do not always think as we do, nor approach a problem in the same manner. However, if a problem has not reached the emotional stage they can discuss the problem with at least as much logic and good sense as we can.

This approach involves a great deal of work and thought. However, democracy involves more work and thought than a dictatorship in governing a country. In both cases I feel the results are worth the effort.

The successful operation of this agreement can have a tremendously beneficial effect for the people of Iran. The most obvious results will come from the improvement in the financial situation there. During the past three years Iran, in spite of deferment of development projects, has been living beyond its income to the extent of some 150 million dollars, in addition to U. S. government aid.

During the next three years some 400 million dollars will accrue to Iran from oil, based on present oil prices. In addition, the oil companies will take over operating costs which will save the National Iranian Oil Co. some 75 million dollars. United States government aid will be required through the next fiscal year, in spite of oil revenues. However, following that period it is expected that the national budget can be balanced without any direct United States aid, provided the tax collection system in Iran is overhauled. In this case the oil revenues will be entirely available for development projects.

The Seven Year Plan organization, now headed by Mr. Ebtehaj, is preparing detailed coordinated plans for development of the country and its resources. Transportation facilities, both railroad and highway, are of primary importance. Cement factories, drinking water supplies, irrigation projects, mining developments and general improvement of communications are among the activities badly needed.

Also, education and public health will be expanded.

Iran has very considerable potentialities in agriculture, mining and certain industrial activities which have been greatly retarded by lack of adequate transportation, communications, water and equipment and too few trained administrators and technicians. Oil revenues spent on these essentials should, if properly carried out, have multiple effects on the future economy of the country. The standard of living in Iran can be increased greatly by these activities. Oil revenue will provide the necessary starter, but the eventual improvement can rise far more rapidly than the equivalent of the oil revenues in terms of consumer goods. We have seen this happen in other countries and there is no reason why it cannot also occur in Iran.

The beneficial effects can be more than material ones. The mutual respect of Iranians and foreigners from the western countries were damaged, but not destroyed, during the period of the oil dispute. There is the opportunity to restore and expand this vital element in relations between nations. Our Ambassador, Loy Henderson, has done wonderful work in this regard. His good work can be augmented and strengthened by the oil operations if they are carried out in the proper manner.

Both the financial aspects and the personal relationship of mutual respect with the West are essential elements required by the government of Iran to discourage and eliminate communism in the country. It should be realized that communism in Iran has been a serious matter. It was only slightly over a year ago that the organized communist minority made a near-successful bid to take over control of the country. Failure of the oil agreement could, we were told, have resulted in a successful coup d'etat by the communists. Whether or not this is so I don't know, but the opposition to the oil agreement on the Moscow radio and in Pravda would tend to support this view.

Another non-financial effect we might expect is an increasing interest by Americans in this fascinating country of Iran. It is a land rich in history and arts; a land of majestic mountains and extensive deserts; a land of lovely gardens and the home of hospitable and charming people. It is also a land of great potentialities in many things other than oil.

I felt that the hard work of the negotiations was more than rewarded by the opportunity to acquire some first-hand knowledge of this country and its people.

Many of you here have no direct interests or activities abroad. Yet all Americans are affected, both directly and indirectly, by events abroad. As oil men, I leave it to you to appraise the value to the industry here of the elimination of a potentially troublesome situation. As tax payers I suggest that the direct gains to you in reducing and soon eliminating the need for United States financial aid are considerable in comparison to what might have been involved if no agreement had been possible. As a friendly people, I feel we all gain when the bonds of friendship with other people are strengthened.

The American oil industry has a vital part to play in this critical international problem. It is doing its part, as it has always done before when the interests of the public and our country were involved.

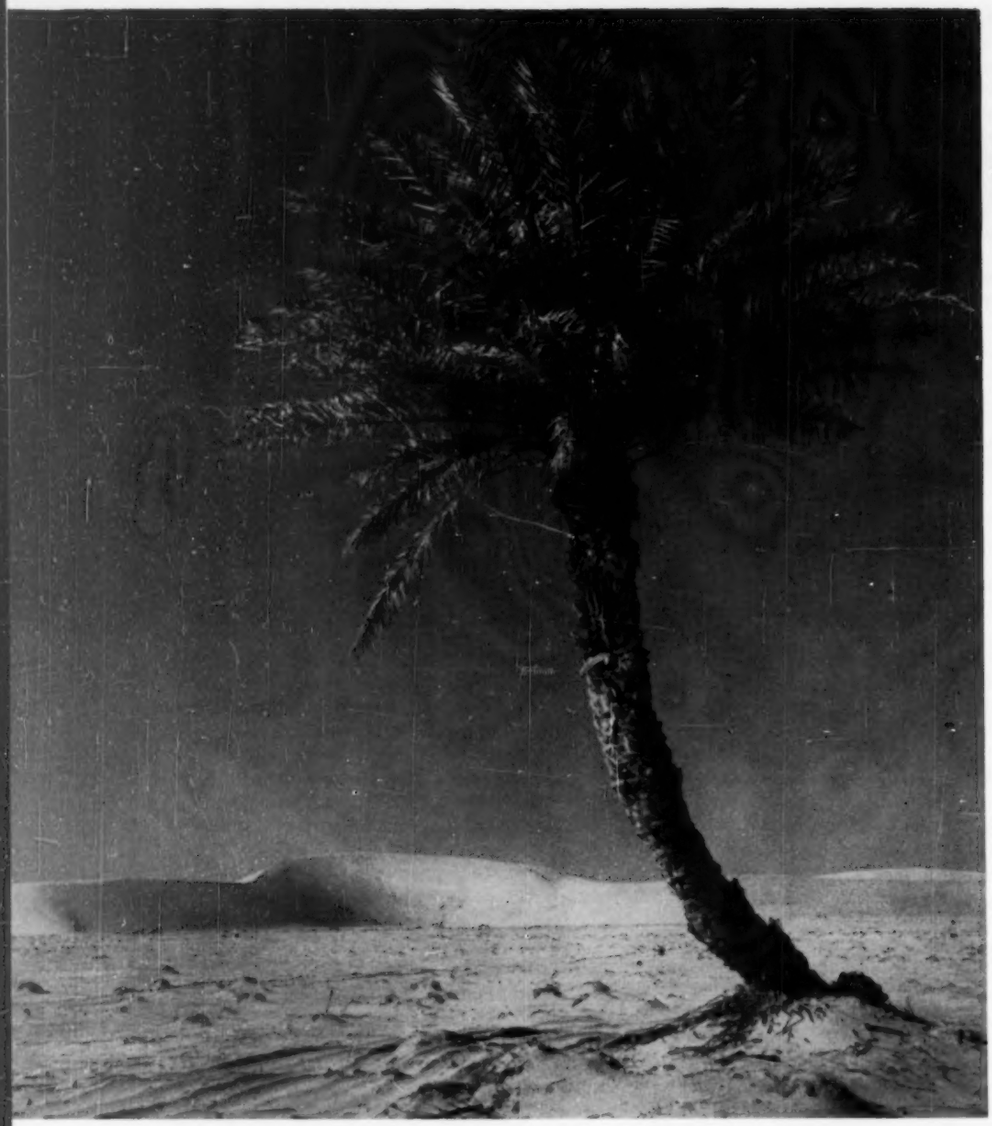


Photo by Richard Finnie for Bechtel Corp.

FOA

On Nov. 1, 1953, the Foreign Operations Administration of the United States asked the National Academy of Sciences and the National Research Council to make a joint study of possible uses of waste natural gas in Saudi Arabia, produced in connection with petroleum operations of the Arabian American Oil Co.

The question of what to do with the gas becomes daily more important since more is constantly being turned out as crude oil production mounts. At present, some 600 million cubic feet daily of natural gas is being produced in the country and the total could easily go higher. About half this quantity is harnessed for useful purposes, but the rest is regarded as waste, or flare gas. The waste gas alone is sufficient to support a 34-inch gas pipe line. Throughout the Middle East a billion cubic feet of natural gas daily is estimated to be surplus or waste gas.

A report now has been completed and submitted to the FOA and to the Saudi Arabian government. It lists a number of possible uses for the gas, although suggesting that many of these would require further study from engineering, economic or political standpoints. James A. Barr was director of the study, and Dr. Samuel H. Manion was assistant director.

The "most hopeful opportunity" of using the gas in a large way, the study finds, seems to lie in liquefaction, cooling and transportation in special barges to markets in Europe.

A project of this type, the study finds, could use 500 million cubic feet of natural gas a day and would entail an investment of $350 million for facilities, including 20 tankers of 15,000 net tons each and a liquefying plant. The cost of the product before return on operations could be $55 million, while the market value of the gas might come to $77 million, the study estimates.

"This proposal is somewhat revolutionary in character and the cost estimates are necessarily preliminary for lack of any experience in this method of transportation," the study points out.

"Based on these estimates, the project would be quite profitable. If successful, it would be of great benefit both to Saudi

studies possible uses of Middle East gas

Arabia and other countries in the Middle East and to Europe.

"The panel recommends that the matter be given careful study by qualified experts as representing possibly the most hopeful opportunity of making use of these gases. It is further suggested that the results of the Chicago project of transporting gas in this way be awaited before firm conclusions are made."

The Chicago study referred to is by W. L. Morrison, who is exploring the best type of barge and other equipment.

While ample gas to fill the needs of an ambitious program of this sort is available in Saudi Arabia at present (about 300 million cubic feet a day), the country could produce more if it tried. Beyond that, there are nearby Middle East countries with surplus gas. In all, a total of one billion cfd is said to be available in the Middle East now. The gas brought to market might be about the same in volume as that estimated in plans for a 2,500 mile international gas pipe line running to Europe; but, says the study, the capital investment for marketing the liquefied gas would be about half that required for the pipe line.

The proposal of a long distance gas pipe line into Europe, suggested some years ago in a detailed study by Bechtel International Corp., would be "economically feasible" and the European market could absorb a billion cubic feet daily of gas through the line, the study finds; however, this project should be considered only "when not ruled out by political or other general considerations."

A number of other uses of the gas were considered by the study, but only the long distance transportation to European markets offered hope of a very large demand.

Other possible uses for the gas mentioned by the study are these:

(1) A cement plant of 400,000 tons yearly capacity, to use four million cfd of gas and require a capital investment of $8 million. "Very promising," said the study.

(2) Sulfur recovery plant producing 65,000 tons a year to use five million cfd of gas and requiring an investment of $4 million.

(3) Fertilizer plant, first step, to turn out 160,000 tons a year of ammonium sulfate and 10,000 tons a year of urea, using five million cfd of gas and calling for an investment of $20 million.

Fertilizer plant, second step, to turn out 18,000 tons a year of ammonium phosphate and 30,000 tons of concentrated superphosphate, and requiring a capital investment of $4.1 million. "Depends primarily upon the export market," said the study.

(4) Carbon black plant with 10,000 tons a year capacity to use 25 million cfd and requiring capital of $5 million. "Fair prospect of profitable operation for export," said the study.

(5) Synthetic rubber plants with capacity of 46,000 tons of GR-S and 46,000 tons of Butyl, to use 5.5 million cfd of gas and requiring a capital investment of $83 million and $59 million respectively. "Considerable longtime appeal," said the study.

(6) Electric power plant with capacity of 40,000 kilowatts a year, to use 11 million cfd of gas and have a capital of $13 million. The power could be used only locally and the cost factors require more study, comments the report.

Comparable figures for transportation of the gas to European markets are:

(1) Gas pipe line to carry 500 million cfd of gas, requiring a capital investment of $500 million. The estimated line would run 1,800 miles of 34-36-inch pipe and 700 miles of 24-26-inch pipe.

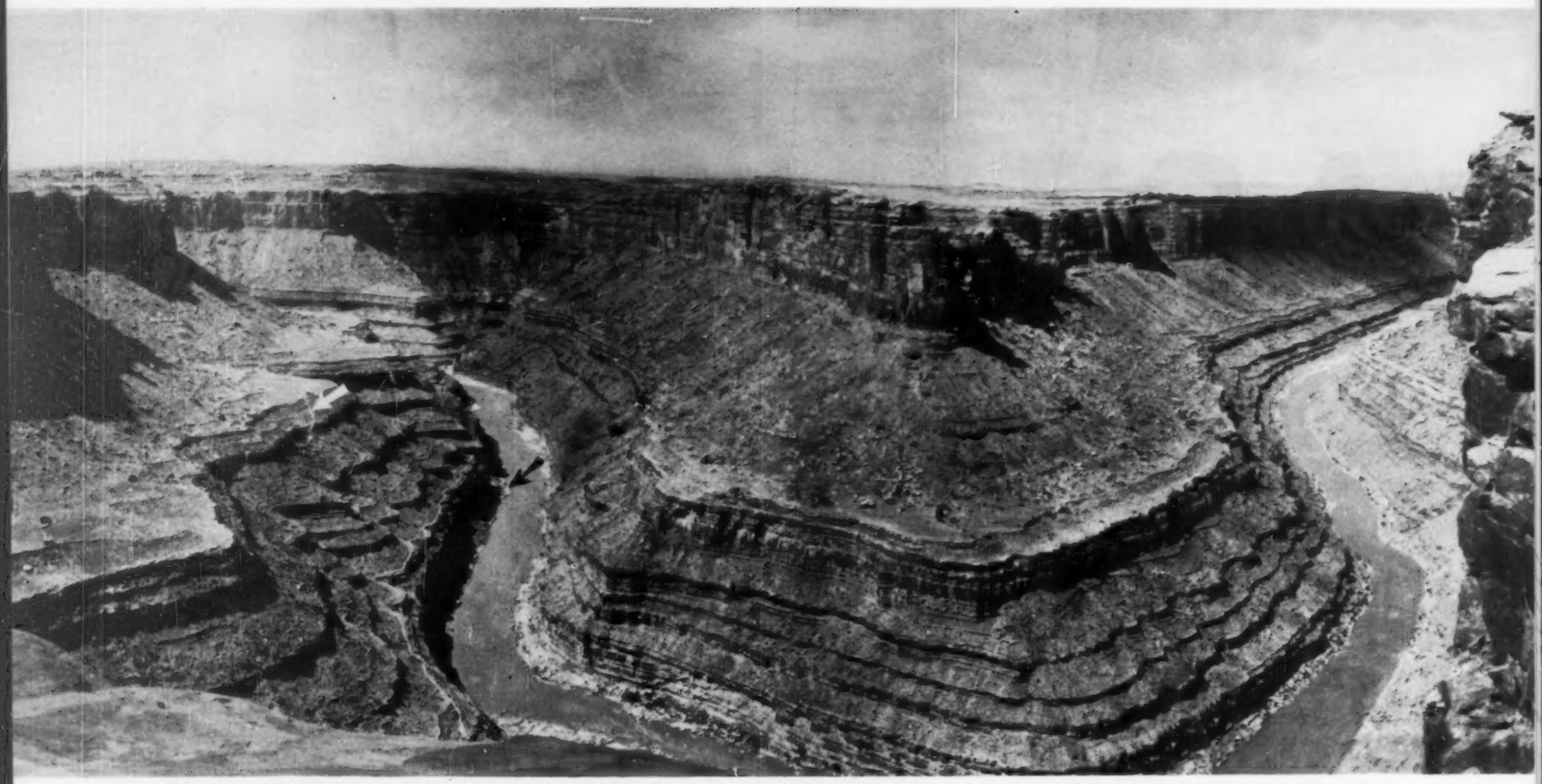
(2) Gas carried in refrigerated barges as a liquid; a capacity of 500 million cfd of gas would call for capital investment of $350 million. A total of 20 tankers of 15,000 tons each would be used and a liquefying and refrigeration plant for 500 million cfd of gas would be erected.

Thomas D. Cabot of the Godfrey L. Cabot Co., Inc., one of the largest carbon black producers in the United States, advised in a letter which is part of the report that the use of gas in Saudi Arabia for a carbon black plant "is not worthy of serious consideration at this time." He said channel black is an "obsolescent quality" as furnace blacks from oil "are capturing the markets because of better quality and despite a somewhat higher price."

Cooperation in the study came from the FOA, the Departments of Commerce, Interior, Agriculture, the Reconstruction Finance Corp., the Tennessee Valley Authority, the Office of Defense Mobilization, the General Services Administration, the House of Representatives Committee on the Interior and the United Nations. The report listed 33 companies and eight co-operating associations.

In addition to Messrs. Barr and Manion, the following individuals participated in conducting the study: Harold V. Bozell, president, General Telephone Co.; Dr. William J. Sparks, director, chemical division, Standard Oil Development Co.; Dr. Harold S. Osborne, chief engineer, retired, American Telephone and Telegraph Co.; Dr. Robert M. Gates, president, Air Preheater Corp.; Thomas H. MacDonald, Texas Engineering Experiment Station; Dr. Frederick M. Feiker, technical director of the advisory committee on international technologic assistance of the Academy and Research Council; Dr. Robert L. Batemen, chemicals division, Carbide and Carbon Chemical Co.; Dr. E. DeGolyer, consulting geologist; Dr. Harry A. Curtis, listed as director, Tennessee Valley Authority; Henry Gardiner Symonds, president, Tennessee Gas Transmission Co., and J. J. King, vice president, his alternate; Joseph Pope, vice president, Stone and Webster Engineering Corp.; R. B. Wittenberg, general manager, chemical division, General Tire and Rubber Corp.; Dr. Mayor F. Folger, vice president, Allied Chemical and Dye Corp.; and Dr. Max A. McCall, operations research office, Johns Hopkins University.

The report, financed by the U. S. government, and carried out in a spirit of cooperation between the members of the study group and the Saudi Arabian government, represents one more factual study looking toward wider use of one of the great sources of energy in the world not being fully utilized.



Despite terrain of the type shown here 35 miles west of Bluff, in southeastern Utah, exploration has been carried out for a number of years. Photo was taken in 1910, and the black arrow on the river bed indicates the location of a drilling rig, down in the 1,600-foot canyon at the site of an oil seep. Equipment was brought in over the road marked by the white arrow and lowered by block and tackle from the lower bench of the canyon wall.

Pacific Northwest Pipe Line key to new frontier

By Tom Dougherty*

APPROVAL BY THE Federal Power Commission of the application of Pacific Northwest Pipeline for a permit to build a pipe line system for the transport of natural gas from the San Juan Basin to the state of Washington and intervening states apparently is to be the starting point for a new era of development in the Rocky Mountain region.

The line will take gas from the San Juan area and fields along the route west of the Continental Divide for use in Pacific northwestern states. It will have a heavy impact on the western side of Colorado, eastern and central Utah and southwest Wyoming in addition to the San Juan Basin area itself.

While the primary gas supply will be from the San Juan district in the beginning, many Rocky Mountain observers feel that exploration of these new areas, development of which has long been retarded by lack of marketing outlets, will in time provide a very large addition to the country's supply of gas.

First of all, the line will provide an additional outlet to San Juan Basin gas and will require new exploration and development there. It will be the first substantial outlet for gas from fields north of the San Juan. Secondly, it will insure exploration of new areas and a much increased interest in gas production throughout the affected area of the Rockies.

The development of the oil industry on the eastern side of the mountains has been rapid over the past several years due to construction of new pipe line outlets. The same stage of development is apparently to result on the west side of the mountains because of the Pacific Northwest line. The existence of gas has long been known through the area and a number of small fields or fields with only small production exist along the route of the line.

The area to be crossed by the line has not been without exploration, primarily for oil, during the past several years, but by comparison with other Rocky Mountain prospects, total exploration has been small. The potential of the area has hardly been touched by the relatively few wells drilled.

The major areas considered to be substantial gas prospects which are to be crossed by the proposed pipe line are the Paradox Basin, Uinta and Piceance Basins, and the Green River Basin in southwestern Wyoming and northern Colorado.

The possible extent of development and

*Staff writer, Petroleum Information, Denver, Colo.

Map shows proposed route of the Pacific Northwest Pipeline.

exploration is shown by the size of the area principally affected. In Colorado this amounts to about 30,000 square miles; in Utah, 36,000 square miles; and in southwestern Wyoming, about 34,000 square miles.

The amount of actual exploration done through much of the area can be judged from Sweetwater County, Wyoming, which has one well for slightly more than 180 square miles.

The Pacific Northwest proposal is for 387 miles of 26-inch line from Ignacio, Colorado, to a junction with a Colorado Interstate Gas Co. line near Green River, Wyoming. Colorado Interstate will cross southern Wyoming to the east, then turn sharply south to serve Denver and way points. Supply will be from the Pacific Northwest trunk.

From the junction with Colorado Interstate, Pacific Northwest proposes 680 miles of 22-inch line to the Spokane, Washington, lateral. From Spokane to Portland, 159 miles of 18-inch line is proposed, with 143 miles of 14-inch from Portland to Seattle, 23 miles of eight-inch from South Seattle to North Seattle, and 74 miles of six-inch from North Seattle to terminus at Bellingham, Washington.

In addition, sales laterals are to be built to Walla Walla, Pendleton, Pasco, and to the Hanford atomic plant by way of Richland. Service also will be extended to other Idaho, Oregon and Washington cities.

Supply laterals will be built from the main line to Piceance Creek in Colorado and to Big Piney and fields of the Big Piney area in Wyoming.

Market requirements are estimated by Pacific Northwest in evidence presented at the FPC hearing at 327 million cubic feet per day in third year peak-day. An additional 50 million cubic feet per day is provided in reserve in design to meet possible peak day requirement changes after the second year.

Pacific estimated reserves proved as of the time of the FPC hearing were stated at 3,646 trillion cubic feet, with 20-year deliverability of 2.327 trillion cubic feet, based on proved reserves excluding a large "Block B" of relatively undeveloped area in the San Juan Basin. This block is known to have proved reserves of 874 billion cubic feet at the present time, based on Mesaverde production only.

The FPC staff readily admitted deliverability of 2.108 trillion cubic feet of gas in the 20-year period as against an estimated market demand of 2.504 trillion cubic feet. This resulted in a staff estimate of 100 percent deliverability for nearly 11 years as compared with Pacific's estimate of 13 years. Both estimates showed a decline to nearly 60 percent of requirements at the end of 20 years.

The 40 percent of the total requirement intervening between need and deliverability from present reserves is a standing incentive to immediate exploration.

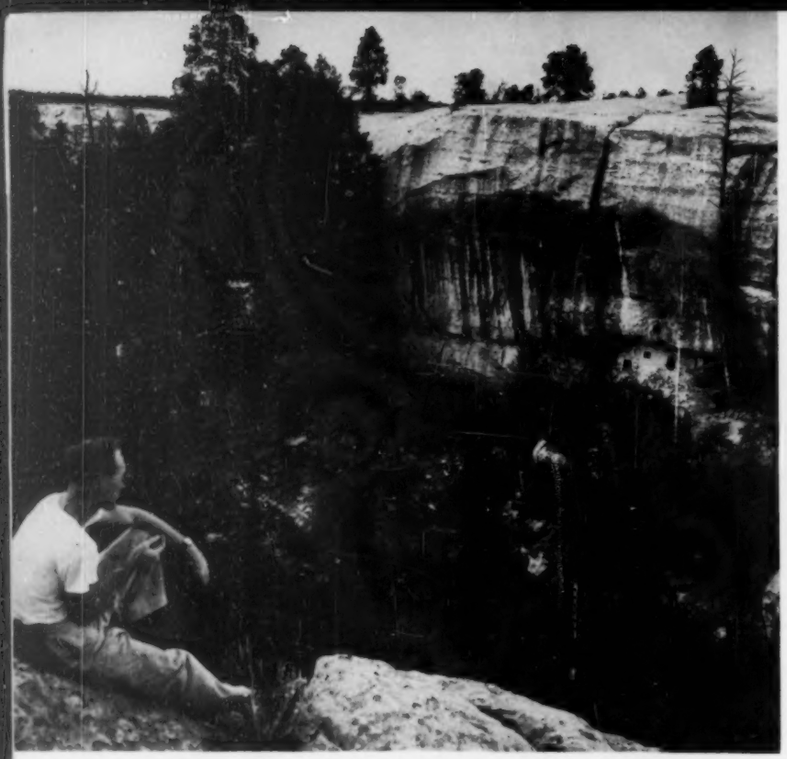
The possibility of a further outlet to northern California and the increasing use of gas in southern California, now being supplied from unaffected reserves in the San Juan Basin, plus the definite increase in gas needs of the growing Rocky Mountain area is further foundation for exploration.

The experience of the present producing area in the San Juan in New Mexico may be taken as an index of the exploration to result from construction of the Pacific Northwest line.

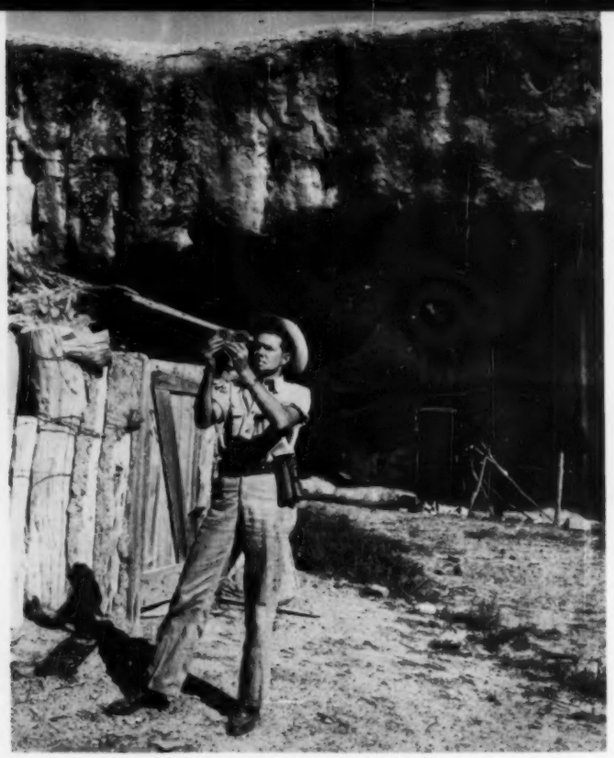
Gas was discovered in the San Juan during the 1920's, but no major effort at development was made until a pipe line outlet to the West Coast was approved in 1950.

The following year, 1951, nine times as many wildcats were completed as were drilled in 1949. In the same year, total completions increased 12 times by comparison with 1946.

Proved reserves of El Paso Natural Gas



Carter geologist W. W. Hallstein encountered these Indian cliff dwellings while checking rock outcrops in the San Juan canyon country.



Against a background of a Ute mud and log dwelling and Indian rock paintings, Carter geologist Don Langston uses his Brunton compass to check dip and strike of San Juan Basin rock outcrops.

Co. in the San Juan are, according to company statement, five to six times greater (in 1953) than in 1950 when expansion of the El Paso system was begun.

Exploration conducted on lands committed to the Pacific Northwest pipe line during the two year hearing has already shown the possibilities of the area to the east of previous San Juan Basin production. Phillips Petroleum Co., conducting a substantial evaluation program on lands covered by agreement with Pacific Northwest, gauged the largest flow from Mesaverde (30 million cubic feet per day) in the history of the Basin in a Rio Arriba County, New Mexico wildcat in 1953.

During 1953 and 1954, wildcats were successful east of previous production in the San Juan Basin. Much of this exploration was predicated on the Pacific Northwest approval, but it must be regarded as only a preliminary step to full exploration and development of the area.

Southern Colorado has had little exploration during recent years, but within the past two years some new activity of note has begun. At the present time Gulf Oil Corp. is conducting its first exploratory campaign in the Barker Creek area in more than 20 years. Discovery in the area was made by Gypsy Oil (now a Gulf division) in 1928. Potential of this early well was estimated at 30 million cubic feet per day, but the well and lease was turned back to the Ute Indian tribe because there was no market.

Twenty-six years later, with the prospect of an outlet, Gulf has entered the same general area.

Development was not deterred by lack of faith in the location: obviously it is the ability to market gas production which makes the difference.

The story of much of the area through which Pacific Northwest will run is similar.

Boundary Butte in San Juan County, Utah, discovered in 1948 by Western Natural Gas, has two Hermosa (Pennsylvanian) producers, three Coconico producers, with all gas production shut in. Shell Oil has embarked on an apparently extensive program of exploration in this area and across the line in Arizona. Shell was a major buyer of leases offered by the Navajo-Hopi tribes in this area in 1953. Other major firms, making up almost a roster of principal operators in the Rocky Mountains, and some largely active in the Permian Basin and southwest, are also represented by lease-holdings as are several independents.

Through western Colorado and eastern Utah, in the Uinta and Piceance Basins, a number of other fields are in similar status. Among those in Colorado are Dove Creek, Highline Canal, Pagoda, Twin Buttes, Douglas Creek, Piceance Creek (shut in for more than 20 years), Mauldin Gulch and Bar-X.

In presenting reserve figures, Pacific Northwest cited Piceance Creek reserves of 95 billion cubic feet, Big Piney, Wyoming reserves at 329 billion and Tip Top reserves as 176 billion cubic feet. These are fields committed to the pipe line in areas of little development, and considered only as supplementary to the major reserve of the company in the San Juan Basin. Their presence, with others in the relatively undeveloped area along the route of the line, demonstrates however the possibilities of future work in these fields.

Since the approval of the Pacific Northwest project, no immediate rash of exploration has broken out in the affected area. New work has been done, but a major exploratory effort comparable to that in oil fields east of the mountains has not yet started. The delay has been in part induced by the confusion surrounding regulation of gas production for interstate sales, and in part has been dependent upon completion of arrangements for construction of the line itself.

A substantial San Juan Basin program and numerous exploration programs further north are known to be scheduled. With final resolution of the potential problem of regulation and with completion of construction, finance and operating arrangements of the line, programs now held in suspense will become active.

During the past two years, additional interest has been shown in the Paradox Basin, as already noted. Shell Oil, Carter, Ohio Oil, Humble Oil & Refining, Superior Oil and other have been active operators.

Through northern Colorado and southern and southwestern Wyoming, new exploration has been evident and is currently in progress. Quintana Petroleum, Mountain Fuel Supply and Carter Oil are active or have made discoveries through the area.

One of the most important features of the exploratory programs in this area is the amount of current consideration being given to Mesaverde possibilities. During 1954, Quintana Petroleum completed a gas discovery in this formation in Moffat

Jeeps are used to follow faint trails which wind through the sagebrush and over rocks too rough for the average car in the northern edge of the San Juan Basin.

County, Colorado, but has gone no further.

In Sweetwater County, Wyoming, Mountain Fuel Supply produced gas from Mesaverde in the Canyon Creek unit, with completions of three and 15 million cubic feet per day in two successful wells drilled to date.

The formation, while a major producer in the San Juan basin, had not atttracted heavy interest so far north prior to the proposal for the pipe line outlet.

Dakota and Morrison production, as well as that from the Mesaverde in western Colorado, is also subject to future development.

Tertiary formations in the Green River Basin have demonstrated considerable possibilities. During 1953 an independent, drilling in the Big Piney area, Wyoming, had a blowout from Almy sand at about 1,200 feet. The well ran wild for a period of several days with a flow calculated by Mountain Fuel Supply at 73 million cubic feet per day, and decreased little during the uncontrolled period. The well was completed for only a fraction of this flow from a very small section of the formation.

The Green River Basin is often cited by geologists as one of the Rocky Mountain areas most likely to produce major gas reserves under future exploration.

It should be pointed out that a majority of the work done along the proposed route of the line has been done in search of oil and that there has been very little concentration on gas, with a few local exceptions. These would include the work done by Mountain Fuel in southern Wyoming and northern Colorado, where the company has developed sizeable reserves.

El Paso Natural Gas, principal gas producer in the Rocky Mountain region by reason of its domination of San Juan Basin operations, has moved northward during the past two years. The company and its affiliates have developed new production, notably the Clear Creek field in Utah, and are conducting new exploratory work through the entire area. The company's entry into southwestern Wyoming some time ago is apparently based on the same favorable appraisal of the area expressed by Pacific Northwest and by operators active there during previous years.

This firm (or its affiliates) currently holds permits for lines into the Denver area and northwestward from southeastern Utah. The possibility of a large-diameter line from Utah to the San Francisco area has reportedly been considered by El Paso with no decision announced.

These projects are among those apparently contingent upon the exploration and development which seems assured by construction of the Pacific Northwest system. In this respect, the project and its relation to the western areas of the Rockies are analogous to the Platte Pipeline and its position as the pioneer outlet for crude oil from the east side of the mountains as far as modern development is concerned.

The Pacific Northwest line is to be routed close to the immense oil shale beds of Colorado, Utah and Wyoming. Eventual processing of shale for production of crude oil will produce a substantial volume of natural gas.

With consideration now being given to a long range program of experimentation by industry aimed at eventual utilization of oil shale resources, the projected line has a unique economic aspect. Future production of oil from shale on an economic basis by private enterprise without government subsidy might be greatly aided by a method of profitable use of the gas by-product. The Pacific line offers such a possibility.

Exploration for and development of uranium through the entire area traversed by the line seems destined to grow steadily. Resulting population increases and increases in industrial facilities make development of gas resources even more desirable.

The principal opposition to the Pacific Northwest line was from Canadian operators, proposing service to northwestern states from Canadian fields. While Canadian gas admittedly needs an outlet, the situation of the undeveloped area of the Rockies, with possible future importance to domestic industry and defense, is such that it is generally felt that development can no longer wisely be delayed.

Market outlets permitting sound economic development are a prerequisite. The Pacific northwest line will provide the outlet, thus permitting development of what may well be extremely vital reserves.

The potential of the area affected, both as to oil and gas, has the confidence of Rocky Mountain operators to the extent that a great deal of money already has been spent and more earmarked. To these operators, aware of the potential and its importance, the Pacific Northwest line comes as a logical sequence and the initial step toward a development of major proportions.

1953 WORLD OIL DEMAND 5.5 PERCENT HIGHER

DOMESTIC DEMAND for principal petroleum products in 64 countries rose 5.5 percent in 1953, according to data gathered by the U. S. Bureau of Mines.

Motor fuel demand rose much more sharply than that for other principal products. Increase in the use of this product was 7.3 percent compared with 5.4 percent for distillate fuels, 3.7 percent for residual fuels, 2.2 percent for lubricants and 1.7 percent for kerosine.

Bureau of Mines demand figures are based on production including fuel consumed at refineries plus imports, minus exports and plus or minus stock changes. Bunker oils are reported as being consumed in the country where ships were fueled. Demand for 1953 on this basis was 94 percent of production, the same as the previous year.

Three areas reported many large increases in demand on a percentage basis than did others. Asia, the Middle East and Western Europe were the largest gainers. The Bureau of Mines does not report on demand in communist countries, but on the basis of production data, it may be assumed that the same pattern of increase in consumption persisted in eastern Europe and northern Asia.

Led by Japan, the increase in South and East Asia rose 19.2 percent in 1953. Japanese oil consumption increased an astonishing 43 percent from 35 to 50 million barrels. Indo-China reported an increase of more than 100 percent, rising from 2.1 to 4.4 million barrels.

In the Middle East the rise of 10.8 percent was quite uniform. Iraq led with an increase of 22 percent and Turkey enjoyed an increase of 12.7 percent.

Western European demand rose 9.1 percent to 550,652,000 barrels. Largest increases were reported in Denmark, Western Germany, France and Italy. The increase in Denmark was 21 percent. In Germany demand rose 17.5 percent, in France 11 percent and in Italy 13 percent.

In Oceania there was virtually no change in the level of demand. Australia showed a substantial decrease in demand and New Zealand has shown little change for two years, but Indonesia and the Philippines are showing remarkable expansion in oil trade.

Latin America was spotty in 1953 with Argentina and Chile reporting losses in business while Brazil, Colombia, Peru and Venezuela continued to boom.

DOMESTIC DEMAND FOR MAJOR PRODUCTS

(Estimated by U. S. Bureau of Mines) (Thousands of Barrels)

	Motor Fuel	Kerosine	Distillate Fuel Oil	Residual Fuel Oil	Lubricating Oil	Year 1953 Total Major Products	Year 1952 Total Major Products
NORTH AMERICA & CARIBBEAN							
Alaska & Hawaii	4,850	169	3,286	6,250	148	14,703	14,360
Canada	71,815	10,044	36,178	42,510	2,690	163,237	149,244
Central America	2,654	476	3,250	5,710	95	12,385	12,040
Cuba	4,955	670	1,664	10,153	218	17,660	16,947
Mexico	18,655	6,579	6,770	30,190	693	62,887	59,761
Puerto Rico	2,766	675	305	3,383	56	7,185	6,608
United States	1,230,629	120,998	493,224	564,933	40,481	2,450,265	2,352,614
Other West Indies	3,850	420	9,650	28,380	200	42,500	44,790
Total	**1,340,374**	**140,031**	**554,327**	**691,509**	**44,581**	**2,770,822**	**2,656,364**
SOUTH AMERICA							
Argentina	13,880	6,330	8,080	31,750	1,015	61,055	62,310
Bolivia	508	97	226	474	8	1,313	1,241
Brazil	21,407	3,440	7,968	16,137	1,091	50,043	45,369
Chile	2,975	832	1,073	4,215	149	9,244	9,508
Colombia	5,296	1,023	1,228	3,386	120	11,053	9,483
Ecuador	808	165	349	685	23	2,030	1,908
Paraguay	332	96	42	3	13	486	330
Peru	3,875	1,524	1,203	4,637	92	11,331	10,472
Uruguay	1,925	1,104	1,118	4,400	73	8,620	8,083
Venezuela	9,527	2,479	5,403	12,829	213	30,451	29,501
Total	**60,533**	**17,090**	**26,690**	**78,516**	**2,797**	**185,626**	**178,205**
WESTERN EUROPE							
Belgium & Lux.	8,205	873	5,521	7,534	625	22,758	20,369
Denmark	4,815	762	3,625	5,740	273	15,215	12,587
Finland	2,580	550	1,230	1,090	100	5,550	4,939
France	33,391	780	20,100	49,510	2,580	106,361	95,860
Germany, West	16,626	357	18,814	9,150	2,802	47,479	40,844
Greece	1,875	697	2,239	4,114	130	9,055	8,785
Iceland	350	30	415	535	31	1,361	1,685
Ireland	2,423	846	724	1,680	120	5,793	5,907
Italy & Trieste	9,756	2,095	9,943	32,250	1,029	55,073	48,665
Netherlands	6,899	1,697	11,520	12,380	425	32,921	31,890
Norway	2,710	574	5,130	6,215	248	14,877	13,915
Portugal	1,173	1,015	2,059	3,063	106	7,416	7,269
Spain	4,320	510	2,638	5,898	425	13,791	12,560
Sweden	8,663	2,840	13,165	14,057	535	39,260	35,533
Switzerland	3,724	275	4,938	1,195	195	10,327	9,361
United Kingdom	57,594	15,060	29,115	55,816	5,560	163,145	154,799
Total	**165,104**	**28,961**	**131,176**	**210,227**	**15,184**	**550,652**	**504,968**
MIDDLE EAST							
Bahrain	122	74	1,342	7,444	14	8,996	8,587
Jordan	245	190	90	——	5	530	519
Iraq	1,035	1,070	481	3,464	130	6,180	5,080
Israel	1,424	1,110	1,137	3,620	110	7,401	6,550
Kuwait	306	81	208	7,551	1	8,147	6,696
Saudi Arabia	987	177	2,772	9,039	27	13,002	12,744
Syria-Lebanon	1,666	653	1,545	1,798	65	5,727	5,029
Turkey	2,686	1,705	2,120	325	326	7,162	6,370
Total	**8,471**	**5,060**	**9,695**	**33,241**	**678**	**57,145**	**51,575**
OTHER ASIA							
Burma	780	350	250	270	60	1,710	1,500
Ceylon	1,200	584	1,243	3,130	50	6,207	6,492
India	7,960	9,230	5,420	5,880	1,030	29,520	28,845
Indo-China	2,784	352	566	515	150	4,367	2,129
Japan	13,049	2,140	3,212	29,480	2,410	50,291	35,160
Malaya	3,060	190	6,170	10,300	130	19,850	19,115
Pakistan	1,510	1,580	1,490	4,850	190	9,620	9,008
Thailand	1,390	520	780	570	90	3,350	2,726
Total	**31,733**	**14,946**	**19,131**	**54,995**	**4,110**	**124,915**	**104,975**
AFRICA							
Algeria	2,122	480	1,771	5,563	138	10,074	8,919
Angola	262	35	85	61	26	469	463
Cape Verde Is.	3	3	465	2,630	1	3,102	2,351
Egypt	2,495	5,590	*4,375	*17,188	230	29,878	30,205
Ethiopia	360	70	60	20	30	540	——
Madagascar	407	94	124	23	41	689	594
Morocco, Fr.	2,788	382	1,127	1,789	119	6,205	5,410
Sudan	582	159	306	619	40	1,706	1,485
Tunisia	741	295	636	890	51	2,613	2,277
Un. So. Africa	10,493	3,630	3,222	1,950	625	19,920	19,720
Total	**20,253**	**10,738**	**12,171**	**30,733**	**1,301**	**75,196**	**71,424**
OCEANIA							
Australia	19,909	3,564	8,770	7,813	750	40,806	44,586
Indonesia	4,740	3,840	3,730	4,750	220	17,280	14,470
New Zealand	5,915	175	1,438	1,804	194	9,526	9,825
Philippine Is.	4,922	1,387	2,629	2,933	209	12,080	10,560
Total	**35,486**	**8,966**	**16,567**	**17,300**	**1,373**	**79,692**	**79,441**
GRAND TOTAL	**1,661,954**	**225,792**	**769,757**	**1,116,521**	**70,024**	**3,844,048**	**3,646,952**
Daily Average	**4,553**	**619**	**2,109**	**3,059**	**192**	**10,532**	**9,963**

*Includes transit trade in ship bunkers.

The three Schlumberger resistivity curves are recorded simultaneously on one trip in the hole for a minimum of rig time. The sphere of influence of each curve, as depicted above, measures a distinct section of the formation. The curves are selected to give you a maximum of information.

WHAT DO YOU SEE ON THE SCHLUMBERGER LOG?

To geologists, engineers, oil executives and bankers alike, "A Schlumberger" is graphic unquestioned proof of production possibilities.

No other electric log is "just like a Schlumberger"... because no other electric log has the background of experience in design, operation and interpretation gained in more than 700,000 field operations. This standard log of the oil industry... the log that has actually become a synonym for the job it does... is available to you through more than 130 Schlumberger field locations in the United States and Canada. Be sure on every survey!

THE EYES OF THE OIL INDUSTRY

SCHLUMBERGER

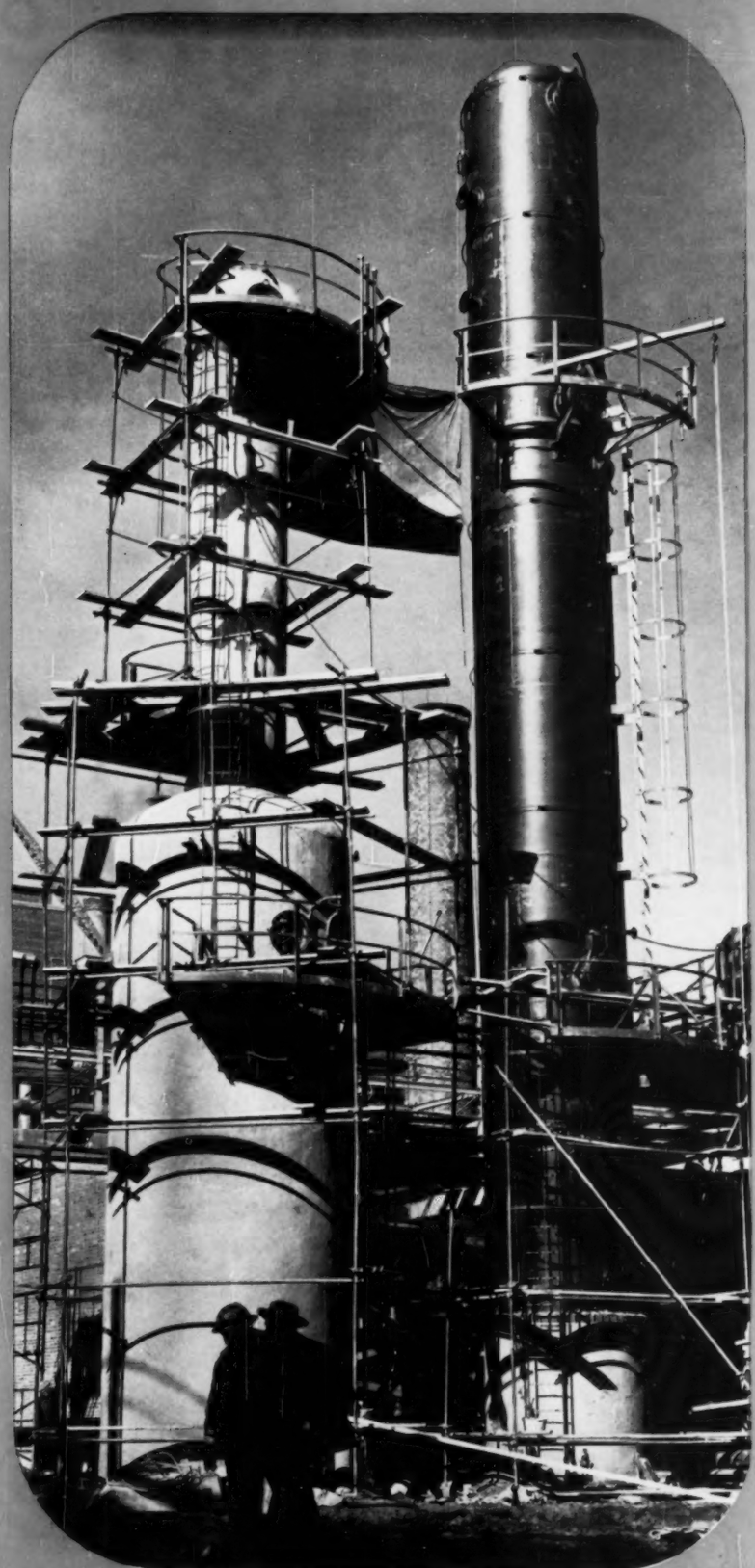
Well Surveying Corporation

ON STREAM
ON TIME
ON BUDGET
ON THE WABASH

By the banks of the Wabash River at Robinson, Illinois, this new 8,330 barrel-per-day Houdriformer of the Ohio Oil Company is on stream, producing a high yield of superior quality gasoline from naphtha charge stocks. The new catalytic reforming unit is equipped with three catalytic reactors, a guard reactor and a three-stage heater.

Engineered and constructed by the Catalytic Construction Company, it was completed on schedule. The actual cost was below the original estimate.

CATALYTIC ON-TIME... ON-BUDGET SERVICES
for the atomic energy, chemical, petrochemical and oil refining industries • Project Analysis • Process Design • Economic Studies • Engineering • Procurement • Construction • Plant Operation



CATALYTIC
CONSTRUCTION COMPANY

1528 WALNUT ST., PHILADELPHIA 2, PA.

In Canada:
Catalytic Construction of Canada, Limited
Sarnia, Ontario

WASHINGTON

sees change of faces as main result of election

By Joseph Huttlinger

WASHINGTON

THE EIGHTY-FOURTH CONGRESS of the United States which opens in January will see sweeping differences, but they may be changes of face and name chiefly, rather than of basic policy.

This, at least, is how it seems to observers who have studied the meaning of the November elections for 435 seats in the House of Representatives and for one third of the 96 seats in the Senate.

Essentially, the changes give a Democratic flavor—to the point of outright control of each chamber—in contrast to the bare majority held by the Republicans during the past two years. The control is by such a narrow margin that it may be more in name than in effect.

As one oil and gas executive in Washington put it:

"It looks like a new coat of paint laid over the same old house. Anyway, the industry seems to get along equally well with Democrats and with Republicans. What is important is control at the White House, which continues under President Eisenhower."

In the field of possible legislation, the interest of the petroleum industry centers largely on three major issues, which are sure to come before the Congress next year. They include:

(1) Legislation to exempt independent producers of natural gas, handling 80 percent of all United States production, from federal price and sales controls.

(2) The move to preserve the 27.5 percent depletion allowance for crude oil and gas production, which is an important incentive to maintaining exploration and building reserves.

(3) The drive for tariff or quota legislation to limit imports of crude oil and products to the United States.

Numerous other matters are virtually certain to come up for attention in the coming year. They include the proposal to halt the government's experiments on synthetic liquid fuels; the policy governing oil and gas leasing of public lands; aid for ship construction, including tankers; and possible modification of the anti-trust laws. Tax legislation undoubtedly will be proposed and the Congress will decide, finally, whether or not to sell the government's half billion dollar synthetic rubber industry.

The change in party control and in the chairmanship of committees may affect the handling and course of legislative proposals. Changes in personnel also have been numerous.

Some critics of oil went down to defeat, among them Senator Guy Gillette of Iowa, who advocated the splitting of oil industry operations into separate handling of production, transport and marketing, and Senator Homer Ferguson of Michigan, who wanted stricter control over natural gas prices. On the other hand, severe critics of the industry were returned. Among them are Senators Estes Kefauver, D., Tenn., Hubert Humphrey, D., Minn., and James Murray, D., Mont.

In the House Commerce Committee, which handles natural gas, synthetic liquid fuels and gasoline price investigations, the chairmanship goes either to Representative Percy Priest, D., Tenn., or Oren Harris, D., Ark. Both are for freeing gas producers from federal controls. They take over from Representative Charles A. Wolverton, R., N.J., who becomes head of the committee minority.

In the House Ways and Means Committee, which handles taxes and oil imports, the chairmanship goes to Representative Jere Cooper, D., Tenn., who replaces Representative Daniel F. Reed, R., N.Y. Cooper has expressed mild criticism of the depletion allowance at the present level and is strongly against any curbs on the import of crude oil and gas. On both counts he reverses the position of the retiring chairman.

The House Armed Services Committee, which gets into tanker construction, naval petroleum reserves and the supply of oil for war, comes under Representative Carl Vinson, D., Ga. He wants the Navy to build its own tankers, instead of renting from private industry as called for by legislation enacted last year. He also is a "Navy first" man and carries the courtesy title of "Admiral."

The House Judiciary Committee will be headed by Representative Emmanuel Celler, D., N.Y., a longtime critic of bigness in industry who has promised a "monopoly" investigation of all industry.

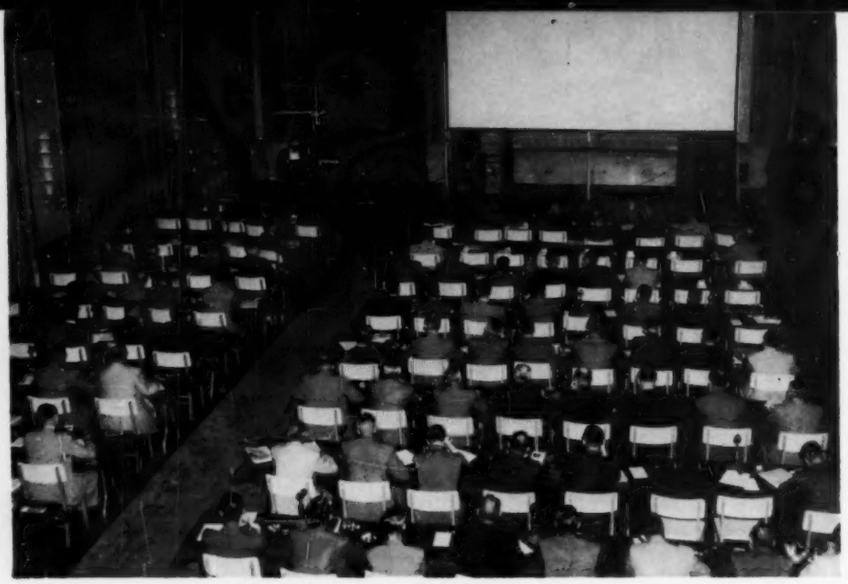
On the Senate side, assuming vote recounts leave the Democrats with a majority, Senator Harry F. Byrd, D., Va., will head the Senate Finance Committee, which handles tax and imports legislation. He is regarded as less friendly toward oil's depletion allowance than his predecessor Senator Eugene Milliken, D., Colo., and more in favor of imports.

Senator Warren Magnuson, D., Wash., a New Dealer from a gas-consuming state, would head up the Senate Commerce Committee, which will handle legislation on price control for independent gas producers. He is a believer in government control of utilities, but is considered a fair man who would give the gas industry a chance to make its case.

The Senate Judiciary Committee will come under another New Dealer, Senator Harley Kilgore, D., W.Va., who is hardly more critical of industry than his predecessor, Senator Langer of North Dakota. He may ask an appropriation to investigate "monopoly" as had been planned by Langer.

The heads of the Democratic forces in Congress are two Texans, Sam Rayburn, speaker of the House, and Lyndon Johnson, majority leader of the Senate. They understand the problems of the oil industry and can be depended on to oppose unfair attacks directed toward it.

On the whole, Washington friends of the oil and gas industries see little change in the alignment of legislative forces as a result of the election. The broad policies governing domestic affairs and foreign relations are not likely to be reversed. The advocates of more extensive government controls and the professional critics of private industry will have their say, but with the close political balance that exists, extensive changes are hardly to be expected.



President E. V. Murphree opens the fall session of Standard Oil Development's technical committee meetings at Atlantic City. Shown in the center is S. O. D.'s new "wide screen," latest contribution to the meetings' effectiveness.

Technical committee meetings key to coordination of research

COORDINATION OF RESEARCH in a large integrated company requires a continuous and specialized program. Standard Oil Development Co., the central research and engineering affiliate of Standard Oil Co. (N.J.), has found that the usual committees, correspondence and consultations do not alone do the job.

Research information must be disseminated to operating affiliates to achieve an optimum appreciation of the value of research and a maximum utilization of new data. This is clearly the responsibility of research management.

On the other hand, research, to be most effective, must be carefully integrated with the needs and objectives of operating companies. Operating problems must be disseminated to those responsible for research so that both basic research and development work can proceed with a maximum of results.

Because of the scope and variety of research conducted, the company's management recognized the need for special measures to achieve the desired coordination with world-wide affiliates. From this thinking the first technical committee meetings were evolved over 25 years ago.

Known within the company as the "TC Meetings" or "Tech Committee Meetings," the sessions are held twice a year in April and October. In recent years, total attendance at each meeting has been around 400 with an average daily attendance of 175.

Attendance consists of representatives from the world-wide operating affiliates and researchers of Standard Oil Development and other Jersey companies where research is conducted.

A typical meeting lasts five days and includes about 50 papers and over 600 slides. Each paper is followed by a formal discussion presented by the operating division most concerned. This in turn is followed by a general discussion in which the entire group participates. Such a format stimulates a free exchange of information between operating and research personnel.

Sections covered at the meeting in October of this year included: chemicals, lubes, waxes and additives manufacturing; product quality; exploratory research; engineering research; and fuels and process developments. A discussion of licenses and patents was also held.

Personnel attending a TC meeting for the first time are awed by the clocklike precision with which the meetings are run. Speakers allotted 15 minutes wind up at 14 minutes and 59 seconds. At the latest meeting 600 slides were flashed on the screen with machine gunlike rapidity without a single error. In fact, over 2,400 slides have been used since the last mistake.

As might be suspected, the meetings were not always so well run. Prior to 1938, speakers talked beyond their allotted time and in the place of slides awkward blueprints and charts were passed around. As one company veteran put it, "the noise and confusion at those early meetings was fantastic. Every time a speaker referred to a blueprint, it sounded like a half-dozen squirrels running around in an oil drum full of crepe paper." Early efforts at modernization included attempts to cut blueprints and diagrams down to a manageable size with the first crude photolith process and an ancient opaque projector that used to get so hot that speakers went home with blisters on their hands. The projector was fondly referred to as the "Infernal Machine."

First attempts to curb speakers were gallant but unsuccessful. A giant alarm clock was faithfully set and it is reported that it rang interminably but without avail. If the meetings were to be a success and achieve their objective, more stringent measures were needed.

The man most responsible for the "new look" is spry Howard R. Tate. Well known in oil circles, Howard, as he is

Jack Carrar (left) and Howard R. Tate, secretary of the meetings, at the special control center. Assistant secretary of the United States National Commission of the Fourth World Petroleum Congress, Mr. Tate will lend his talents to Professor Carlo Padovani to coordinate Congress meetings.

John Forgrieve of the Esso Engineering Department tries the "electronic lectern." An electric clock remotely set, an amber warning light, a flashing red terminal light and a smoke screen for die-hard orators are features of the lectern.

known to almost everyone, serves as secretary of the meetings. With the precision of a Swiss watch maker he assembles the pieces and serves as mainspring throughout the meetings.

How, you might ask, does Howard do it? The answer is that Howard, a chemist by training, put his scientific training to use.

He encouraged James A. Wilson of Esso Laboratories' Research Division to develop a scientific lectern. The results are a lectern with the following features:

(1) Adjustable height: By pushing a button either on the lectern or at the control center, the lectern can be raised or lowered to the proper height.

(2) Electric clock: an electric clock is remotely set from the control center to the allotted time. As an added precaution for papers that start to drag, the clock can be speeded up as much as 20 percent.

(3) Light beam pointer: To facilitate desired emphasis, an arrow-shaped beam of light can be directed from a special light beam pointer.

(4) Amber warning light: With two minutes to go, an amber warning light comes on.

(5) Red terminal light: When time is up, a flashing red light comes on.

(6) Smoke screen: If the amber warning light and flashing red light don't do the job, a smoke screen is set off.

Needless to say, the smoke screen is usually sufficient to deter even the most hearty of orators. But if a courageous speaker, with vision blurred by smoke filled eyes, persists in his verbalization, the heavy artillery — comic slides — is called into play. Prior to the time when lady chemists joined the company, it is reputed that the slides were on the risque side. Now most slides would pass any competent state censors. But they still are effective as an oratorical squelch.

Another feature of the meetings is the arrangement of over 75 microphones so that each member of the audience can participate in the discussion periods. To eliminate coughs and other audience noises, the microphones do not operate until they are grasped by the speaker.

To facilitate the handling of slides and other visual aids, an elaborate projection center is set up. Howard Tate and his assistant, Jack Carrar, operate from the control center where they record presentations and discussions and operate the lectern and public address systems.

After meetings are over, 33 1/3 rpm recordings are made and sent to laboratories throughout the world for personnel who did not attend. Five years ago, minutes were discontinued in favor of recordings. If portions of the proceedings require special attention, transcripts are typed directly from the tapes.

As a permanent record of the TC meetings a bound volume which includes summaries of papers and remarks by section chairmen is given broad distribution.

In the early days of the TC meeting, there was a steady interruption by phone calls and harrassed secretaries. To eliminate such interruption the meetings are held away from company units, usually at Buck Hill Falls, Pennsylvania, or Atlantic City. Every effort is made to keep personnel together for meals and informal recreation in the evening. This extends personal friendships among the affiliates, a factor which contributes to year around coordination.

The TC meetings have made a significant contribution to improved coordination of Jersey Standard's world-wide research activities. And certainly their success has been due in large measure to the efforts of Howard Tate. Always looking for new ways to improve the meetings, Howard's latest innovation is the new "wide screen." He claims that a department head with an extreme case of myopia can read the most detailed diagram from 75 feet. What's next? Well, it's running around the company that it may be 3-D and stereophonic sound.

Larry B. Garland, Jr., below, and Harry F. Tracy team up to run the battery of projection equipment for the company's technical committee meetings. They project an average of 600 slides at each five-day session and have run as many as 2,400 without a mistake.

Washington PIPE LINE

By Joseph B. Huttlinger

Primer Lesson On Gas Control

One of the questions bothering sincere members of the Congress is this:

If the federal government is to exercise price controls over some 4,000 independent producers of natural gas, operating 65,000 gas wells, why not exercise it over all oil wells, all coal mines, and over every other type of production?

Why not, for instance, exercise it over steel, which is needed to drill the gas wells,

Why, they ask, single out natural gas?

The answer is, "There is no good reason."

The new controls spring from the Natural Gas Act of 1938, designed to regulate long distance gas pipe lines which have monopoly characteristics. As now interpreted by the Supreme Court, this act gives the Federal Power Commission the duty of setting the price of natural gas at each of the 65,000 gas wells in the United States.

Under wartime conditions, price control was accepted, for then it was attributed to the emergency and covered every industry and even wages. In peacetime, under normal conditions, the history of the United States is that free enterprise rules except in situations such as electric power distribution, interstate transportation and pipe lines where monopolies exist or might arise.

There is no monopoly when 65,000 gas wells fight for a market.

No one has ever said there is.

Truly, the government is embarking upon a new program, if it tries to control the price of gas at the well but imposes like controls on no other industry. If the government goes ahead, will it not stir up a Pandora's box of troubles that will lead, in the end, to utter chaos, or else to utter socialization of all industry?

To Tell The Facts

The petroleum and natural gas industries are teaming up in the drive for legislation to exempt independent gas producers from federal controls in the new Natural Gas and Oil Resources Committee of which L. F. McCollum, president of Continental Oil Co., is chairman. Paul Kayser, president of El Paso Natural Gas Co., is vice chairman. Baird H. Markham, former director of the American Petroleum Industries Committee, is full time director. The committee offices are in the Empire State Bldg., New York.

Mr. McCollum said:

"New consumers as well as others have a great stake in knowing the facts with respect to their future gas supply, and the committee plans to present these facts to interested groups throughout the country as well as to the public at large."

Electricity For Atomic Power

Phillips Petroleum Co., Bartlesville, Okla., first in many fields, is embarked upon a study, in cooperation with eight other companies and the United States Atomic Energy Commission, of the prospects of producing electricity from atomic power on a cost basis competitive with electric power from coal or oil. Five electric companies, two chemical corporations and the Riley Stoker Co. are taking part in the study. The ultimate aim, it is understood, is to find a method of making power from atomic energy that will be cheap and practical, and then, perhaps, to find a way for private enterprise to do the job.

Depletion Allowance Too Small?

The income tax depletion allowance of 27.5 percent for crude oil and natural gas production may be too small, rather than too large, according to the Independent Petroleum Association of America.

In a statement submitted to the President's Cabinet Committee on energy policy, the IPAA pointed out that an oil producer may write off 27.5 percent of his gross income before computing taxes, but that the writeoff may not exceed 50 percent of net income.

"This 50 percent limitation on depletion has become an increasing burden, especially on the small stripper well operator whose costs are high and whose output consists largely of marginal production," said W. M. Vaughey, president of the association.

He suggested, therefore, that Congress be asked "at the earliest opportunity" to pass legislation ending the 50 percent limitation. Further, he said, the time may come when an increase in the present percentage depletion may be needed. This, he said, would come if "consumption continues to increase along with a less favorable trend in reserves."

Must Consult Unions On Stock Purchases

During the past decade, petroleum and other companies have started stock purchase programs under which employees may buy stock shares, usually with the company paying part of the cost. This movement now is up for complete restudy.

Up to the present, a move to set up a stock purchase plan for employees was a free gesture on the part of a company; now, however, the National Labor Relations Board has ruled that any company with this kind of program must bargain about it with the labor union, if the union asks, just as the company bargains about wages and hours of work.

The decision of the board came in a case directly affecting Richfield Oil Co., Los Angeles, and on appeal of the CIO Oil Workers International Union. The board voted three to one for the union. Richfield says it will carry the case to the courts, including the Supreme Court if necessary.

Urges Dispersal Of Fuel Plants

The National Petroleum Association, a generally conservative organization representing petroleum refineries located mostly in the eastern states, is suggesting that the Department of Defense earmark some of its buying, particularly of jet fuel, to small and independent oil refineries.

The aim, according to A. W. Scott, president of the association, would be to encourage "dispersal" of industry and to help business.

"A good example of a product to which this policy could be applied," Mr. Scott said, "is jet fuel. The Armed Forces are buying approximately 70 million barrels of jet fuel during the current fiscal year; it is estimated that this demand will double within the next five years —without a war." Jet fuel, he adds, can be made in almost any petroleum plant without the special facilities needed for aviation gasoline.

The association gave its views to the President's cabinet committee on energy policy, which is to make a report about the end of the year to President Eisenhower.

Mr. Scott is "disturbed," he said, at growing concentration of the petroleum refining industry in "vulnerable" areas. He quoted statistics showing that the United States in 1940 had a refining capacity of just over four million barrels daily, and a total of 547 petroleum refineries. Thirteen years later, he said, the capacity was doubled, and the number of refineries is down to 337.

Personnel

Hugh A. Stewart, who has been acting director of the Oil and Gas Division of the Department of the Interior, has been named director, it is announced by Secretary of the Interior Douglas McKay. Carroll D. Fentress has been named assistant director. The men had held these posts before the creation of the now ended Petroleum Administration for Defense. Mr. Stewart was with the Texas Co. in Denver before he joined the OGD some years ago, replacing the late Max Ball. Mr. Fentress has worked with Standard Oil Co. (Ind.).

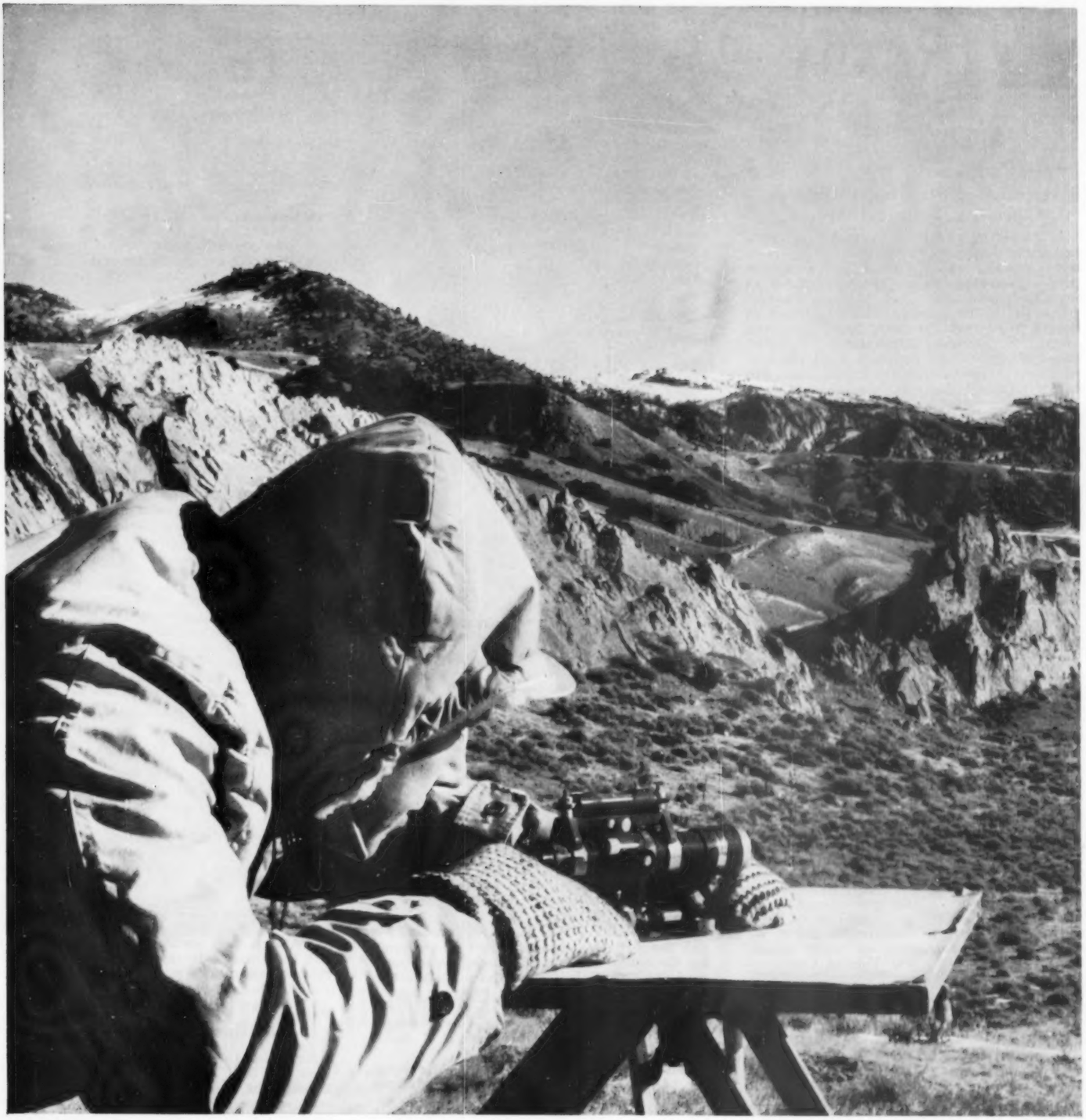
William M. McEldowney of Pittsburgh has joined the OGD as petroleum transportation and storage specialist, Secretary McKay announced. He had been employed by Gulf Oil Corp. from 1923 until June 1952, when he resigned. He had been engaged in various phases of Gulf's petroleum operations, principally transportation, distribution and sales. He was born in Edgewood, Pa., in 1902, and attended Princeton University.

Alexander R. Rehrig of Bartlesville, Okla., has joined the OGD as refining technologist. He had been employed in the refining department of Phillips Petroleum Co. from July 1941 until his recent appointment. He was born in Winnipeg, Can., in 1917. He received his B.S. Degree in chemical engineering from the University of Nebraska in 1940.

Several new appointments have been announced by the Bureau of Mines representing promotions among the Bureau personnel. Thomas H. Miller, formerly assistant director of operations, becomes deputy director; Paul Zinner, formerly chief of the minerals division, becomes assistant director in charge of programs; Clifford W. Seibel, formerly a regional director, becomes assistant director in charge of helium operations; and James Westfield, formerly chief of the health and safety division, becomes assistant director in charge of health and safety operations.

The new Washington headquarters division chiefs are: Charles W. Merrill, minerals division; Louis G. McCabe, solid fuels division; Rosco A. Cattell, petroleum and natural gas division; Harry F. Weaver, coal mine inspection division; E. W. Pehrson, foreign division; and William E. Rice, administration division.

The new regional directors, who will be in charge of all Bureau operations in their respective areas with the exception of health, safety and coal-mine inspection work are: Stephen M. Shelton, Region 1, comprising the states of Idaho, Montana, Oregon, and Washington, together with the territory of Alaska; Harold C. Miller, Region II, comprising the states of California and Nevada; and John H. East, Jr., Region III, comprising the states of Arizona, Colorado, Nebraska, New Mexico, North Dakota, South Dakota, Utah and Wyoming.



"To the free man, all things are possible. Opportunity is the wand which can change the useless into the useful, waste into raw materials of great value, exhaustible resources into inexhaustible resources. It is the key that unlocks the greatest energy source of all—the infinite power of the human individual."

ESSO

STANDARD OIL COMPANY (NEW JERSEY)

AND AFFILIATED COMPANIES

CANADA

Opening of Stanavan Plant Ups Vancouver Refining Capacity

A $10,000,000 addition to British Columbia's expanding petroleum industry went on stream late in October when Standard Oil Company of British Columbia opened its new refinery at Stanovan on the south shore of Burrard Inlet.

This is the third large refinery project in British Columbia's "Refinery Row" since the completion of the Edmonton-to-Vancouver Trans Mountain Pipe Line and the tank farm on Burnaby mountain. Standard's expansion brings the total refinery and storage investment in the area to $50,000,000. Imperial Oil and Shell both have completed modernization and additions to their refineries to tie in with the coming of Alberta crude to the Pacific Coast through the Trans Mountain Line.

The new plant occupies a 75 acre site at Stanovan, has a capacity of 11,000 barrels per day and replaces an older plant of 8,500 barrel capacity. Part of the old plant will be used for storage.

Ralph D. Baker, president of Standard of British Columbia and host to more than 1,000 business leaders and to Premier W. A. C. Bennett and members of the provincial legislature at the opening ceremony, said the increased facilities were justified by the continued expansion and development of British Columbia.

Mr. Baker added that completion of the refinery enabled Standard to produce its petroleum products from Canadian crude. Formerly all its crude was brought from California by tanker. Alberta crude is received at the new refinery through a 12-inch five-mile feeder pipe line from the Trans Mountain Pipe Line Company's tank farm on Burnaby mountain.

Initial clearing of the site and grading started in July 1953, with Fluor of Canada beginning actual construction in March of this year. John D. Park was the construction engineer.

More than 95 percent of all purchases of material in the new refinery construction were made in Canada. Principal contractors for the $10,000,000 project, in addition to Fluor, were: Dawson and Wade Co. Ltd., pipe line construction; General Construction Co. Ltd., grading and paving; Northern Construction and J. W. Stewart Ltd., construction of boiler plant; Swift River Dredging and Yorston Construction Ltd., underground sewers and water lines; A.I.M. Steel Products Division Ltd., steel fences; Arrow Transfer, pipe line construction; Fleck Brothers Ltd., insulation; Dominion Bridge Co. Ltd., large vessels for reactor and regenerator; British Columbia Bridge and Dredging, piping and building; Hume and Rumble Ltd., electrical work and substation with 12,000 volt feeder lines; Horton Steel Works Ltd., storage tanks of 240,000 barrels capacity; Western Bridge and Steel Fabricators Ltd., steel construction; City Construction Co. Ltd., grading and paving; Leek & Co. Ltd., piping and insulation; Drexel and Co. Ltd., insulation; Vancouver Iron Works, large columns and vessels; and Canadian Wood Pipe and Tanks Ltd., construction of cooling tower.

Major sections of the new plant are the two-stage crude distillation unit, fluid catalytic cracking plant, gas recovery plant and catalytic polymerization unit.

In an addition to the refinery proper, 27 all-steel welded storage tanks, a three-island tank truck loading rack, a garage and marketing department warehouse have been built to handle the increased output.

For the official opening of the plant, the 1,000 guests were taken to the site aboard the Canadian Pacific steamship Princess Patricia, which took the party from the heart of downtown Vancouver to the deepsea dock at Stanovan.

Construction engineer J. D. Park, Jr., supervised the construction of the new Standard Oil of British Columbia refinery addition at Standard's site at Stanovan on Burrard Inlet, near Vancouver.

Chartered buses were at the dock to take officials and guests along for a tour of the 75 acre site.

Premier W. A. C. Bennett complimented Mr. Baker and T. S. Peterson, president of Standard Oil of California, on Standard's new investment in British Columbia. He said that taxes on the new refinery would go, in part, to the province's road-building program. Mr. Bennett's official act of putting the refinery on stream was climaxed by the pressing of a master control button which transformed the forest of pipes and towers into a blaze of light in the early evening darkness.

Victor Wiebe, a Standard of B. C. director and the refinery manager, acted as chairman for the official ceremonies. Executives of Standard Oil Co. of California who made the trip to Vancouver with President Peterson for the opening included G. A. Davidson, vice president and director; P. J. Fahrney, vice president; W. W. Davison, vice president; and H. C. Judd; treasurer.

A unique project undertaken with the building of the new refinery is a two-level scale model of the new plant which was built in Vancouver for display at the opening. Buchanan, Carmichael and Clark Displays Ltd. built the model with its 30,000 individual pieces, most of which were handworked, in 12 days.

It is 14 feet long, six feet at the widest point, seven feet high and weighs 400 pounds. For portability, it was built in seven main sections. Built on a scale of one-quarter inch to the foot, it was designed from more than 350 individual engineering drawings and plans.

Increased refinery facilities in British Columbia and neighboring Washington State have boosted Trans Mountain Oil Pipe Line nominations for November to 52,637 barrels per day, highest since the line was finished in the fall of last year. This is an increase of 14,000 barrels a day over October.

Standard of British Columbia ordered 9,537 barrels daily, General Petroleums ordered 11,500 for its new Ferndale, Washington plant, Imperial Oil asked for 15,200 barrels, British American 5,700, Canadian Gulf 7,500 (for Shell's Burnaby refinery), and Royalite at Kamloops, 3,200.

Gasoline prices were reduced as much as 1.2 cents per gallon in October in the Vancouver area and stove and furnace oil was cut one-fifth of a cent per gallon. Imperial was the first to announce the cuts, which were quickly adopted by other firms.

Crude oil price dropped nine cents a barrel October 15 when the first delivery of Alberta crude was made to General Petroleum in Ferndale, Washington.

Bunker oil for ships calling at Vancouver was reduced 24½ cents per barrel, bringing the price to about $2.20 per barrel. The reduction will make Vancouver prices competitive with Puget Sound ports.

Complete Platformer

Trinidad Leaseholds (Canada) Ltd. has completed the first step in a modernization and expansion program by placing in operation a 1,500 barrel UOP Platforming unit at its Port Credit refinery.

Addition of the Platformer, the second to go on stream in Canada, has enabled the refinery to increase its crude capacity to 8,000 b/sd because straight run gasoline formerly processed in a thermal cracking unit now is being Platformed; therefore more heavy oil may be charged to the thermal cracker. The Platforming unit, built by Procon (Canada) Ltd., was erected in record time. It went on stream just five months after ground was broken.

Husky Buys Riverlake Oil

Husky Oil & Refining Ltd. has purchased Riverlake Oil Ltd., including its refinery located on Lake Superior at Fort William, Ont., and marketing outlets in the Great Lakes area.

Plans are under way to expand the present refining capacity to 5,000 barrels a day and to install additional facilities. A new asphalt plant will be constructed. Marketing outlets for gasoline and diesel fuels will be greatly expanded.

The purchase and expansion of the Riverlake refinery at Fort William will increase markets for Alberta and Saskatchewan crude oil and will supplement Husky's present 8,500-barrel refinery operation at Lloydminster on the Alberta-Saskatchewan border.

Frobisher Regulations Issued

Regulations covering operations in the Frobisher oil field have been outlined by J. H. Brockelbank, Saskatchewan's minister of mineral resources. The Frobisher field was discovered by Canadian Gulf Oil Co. in southeastern Saskatchewan. The geographic boundaries of the field defined under the regulations of the Oil and Gas Conservation Act run four miles north and south and five miles east and west.

Mr. Brockelbank noted that an interim well spacing in the field is based on 80 acres, but that production allowables will be calculated on 40 acres.

Saskatchewan Discovery

Significant light oil discovery has been made in southeastern Saskatchewan by the Tidewater Associated Oil Co. at Tide Water Ajax White Bear No. 4, about eight miles north of Carlyle on the southern edge of the White Bear Reserve. The legal description of the well site is 9-12-9-3-W2nd. Producing horizon is the Mission Canyon, found at 4,121-31 feet. Oil recovered in a drill stem test was about 32 gravity.

Night-light time

WHILE MOST OF the world sleeps, Anglo-Iranian's refineries and distribution organisation are working for the benefit of mankind.

The child's night-light is a small example. The world demand for energy has doubled in the last twenty years and oil supplies two thirds of this.

Anglo-Iranian makes an impressive contribution. Last year production averaged over 640,000 barrels of oil a day. There are refineries in eight countries and one of the world's largest privately-owned tanker fleets to carry the oil. The company's marketing organisation stretches from Iceland to Tasmania.

Half a century of enterprise and continuous progress have put Anglo-Iranian among the world's largest and most progressive oil companies.

THE BP SHIELD IS THE SYMBOL OF THE WORLD-WIDE ORGANISATION OF

Anglo-Iranian Oil Company

LIMITED

New Refinery Units Planned

Imperial Oil Ltd. will build a catalytic polymerization unit and a naphtha fractionator at its Ioco, B.C., refinery. The new installation will represent the biggest development at Ioco since the completion of a $13,500,000 construction program in September, 1953. Construction contracts were awarded in November and it is planned to have the units completed by October 1955.

JAMES G. LIVINGSTONE has been appointed manager of the coordination and economics department of Imperial Oil Ltd. He succeeds John F. Fairlie, who has been made assistant manager of the Quebec marketing division.

Mr. Livingstone joined Imperial in 1942 at the Sarnia refinery, of which he was made chief process engineer in 1951. He spent 1953 at the Winnipeg refinery as assistant superintendent before becoming assistant to Mr. Fairlie in Toronto.

Mr. Fairlie also began his company activities at an Imperial refinery. He served at Montreal and Sarnia before his military service overseas in World War II. He was a member of the economics and coordination department of Standard Oil Co. (N.J.) for two years before being made assistant manager of the same department in Imperial. He stepped up to department head in 1949.

BRUCE H. MACKENZIE has been appointed to the new position of assistant manager of the pipe line division, transportation and supply department of Imperial Oil Ltd., Toronto. He joined Imperial at its Sarnia refinery in 1940. Three years later he was loaned to the St. Clair Processing Corp. (a subsidiary of the government-owned Polymer Corp.). He returned to Sarnia refinery in 1945 as a process engineer. Early in 1951 he was made coordinator for the Sarnia refinery expansion program and held this position until he was transferred to Toronto in 1952 as chief engineer of the pipe line department. For the past few months, Mr. Mackenzie has been acting manager of the Sarnia products pipe line.

H. B. TREFZ has been appointed manager of the Sarnia products pipe line of Imperial Oil Ltd. After experience on pipe line systems in Wyoming, Montana, Texas, Ohio and Michigan, he joined the Transit and Storage Co., an Imperial subsidiary supplying crude to Sarnia refinery, in 1936. This company was sold last year when the Interprovincial line reached Sarnia with crude from Western Canada. At that time Mr. Trefz was vice president and general manager of Transit and Storage Co. He joined Imperial early this year.

E. DONALD WILSON, assistant manager of Imperial's Regina exploration district since 1952, is now a management assistant in the western producing division and a member of the division management committee. He was with Royalite Oil Co. before his service in World War II. On his return to civilian life, he joined Imperial's producing department and in 1948 became division petroleum engineer at Calgary. He transferred to Toronto in 1950 as operations advisor in the producing department. Two years later he returned to the west.

LUIS GARCIA has succeeded Bruce Mackenzie as chief engineer of the pipe line division of Imperial Oil Ltd. K. R. Shipley, formerly of Winnipeg refinery, is now assistant chief engineer. Mr. Garcia joined the Transit and Storage Co. in 1946 and a year later became chief engineer of the company. He transferred to Imperial in 1943 as assistant chief engineer of the pipe line division and by the end of the year was acting chief engineer.

DR. CAMERON H. CEASAR has been appointed assistant manager of the research department of Imperial Oil Ltd. He has been chief research chemist since 1951.

R. E. Wilson

Dr. Wilson Speaks of Oil's Future At Mandan Dedication

Speaking at the formal dedication of the Mandan, North Dakota, refinery of Standard Oil Company (Indiana), Dr. Robert E. Wilson, chairman of the board of directors, contrasted the new, thoroughly modern plant with that of the Wood River, Illinois refinery, built in 1907, which was, as Dr. Wilson explained, the only other refinery built by the company "from the ground up."

At the time of its construction, Wood River represented the furthest advance of the refining art of that day. Built to process a crude input of 6,000 barrels daily, the refinery cost roundly $2.5 million, or about $400 for each barrel of daily capacity. It had 355 employees and so processed approximately 17 barrels of crude daily per man.

By contrast, the Mandan refinery, a very different creation from its predecessor of nearly 50 years ago but, like it, representing the very latest progress in refining procedure, designed and constructed by The Lummus Company, cost roughly ten times as much as its early prototype; but it handles a throughput of 30,000 barrels daily with only 250 employees, or 120 barrels daily for each worker.

In spite of the more complicated processes of the newest refinery, an actual simplification in operation has resulted from the improvements introduced during nearly five decades. In the original Wood River refinery there were 18 coking stills, six rerunning stills and, ten years later when capacity had risen to 8,000 barrels daily, 120 Burton batch cracking stills.

By way of contrast, at Mandan a single unit combines distillation, catalytic cracking, vapor recovery and polymerization in one continuous process. Aside from the greater recovery of valuable fractions from the crude, the products are of higher quality, enabling each gallon to produce 60 percent more power.

Looking ahead, Dr. Wilson declined to make specific predictions as to future advances, but indicated certain lines along which research is progressing at the present time which give hope of progress in the future equal to that of the past. Among these, he mentioned the trend toward the use of special catalysts to direct chemical reactions along desired lines so that, depending on the agent employed, it will be possible to provide a variety of products. He pointed to the growing list of chemicals, fibers and foods. "After all," he said, "plants and animals are themselves chemical factories. They use catalysts of many kinds to convert simple chemicals into complicated things like beefsteak. What we are doing now is learning more and more about how to accomplish the same result in our own factories, most often with petroleum as a basic raw material. Wary as I am of forecasts, I do predict that within the next 50 years, an appreciable part of the world's food will be produced in chemical reactors from air, oil, and water."

Sun Tanker Launched

The *S.S. Western Sun*, newest addition to the fleet of Sun Oil Co., was launched October 16 at the Chester, Pa yards of Sun Shipbuilding & Drydock Co. Some 5,000 Sun Oil employees attended the launching ceremonies.

The new vessel is a 30,000 dwt supertanker with a cargo capacity of 251,000 barrels. Length is 641 feet, breadth 84 feet and draft 34 feet. Normal shaft horsepower is 13,500 and speed 16½ knots. She is the third of four supertankers in Sun's present building program. Sun's fleet now numbers 19.

New Treating Agent

A new chemical treatment of gasoline, to cut deposits in automobile engines, was described by H. Beuther and R. G. Goldthwait of the Gulf Research & Development Co., Pittsburgh, Pa., at the September national meeting of the American Chemical Society. The treatment, with small amounts of BF_3 (boron trifluoride — a colorless gas), also reduces sludge formation in storage tanks. Octane values are not affected. Quantities of BF_3 amounting to even less than one-tenth of 1 per cent of the gasoline weight are effective.

The new treatment consists of bringing the BF_3 gas into contact with the unstable cracked gasoline in a relatively simple reactor, followed by settling to remove the small amount of insoluble sludge which is produced. The gasoline is then washed with water to remove residual BF_3 and redistilled to remove soluble sludge formers. The operation is carried out preferably at room temperature, atmospheric pressure and contact times of one to ten minutes.

Tank Heaters

New 4-page Bulletin No. 541 describes the "TF-18" tank heater that mounts vertically, preventing sediment from settling on the heating surface, avoids heating through a layer of sediment, and leaves the bottom of the tank uncluttered and easy to clean. Said to provide more efficient, less costly tank heating than old fashioned bottom coils, it can be installed quickly and inexpensively in new or existing tanks without requiring welding in the tank. For information, write to the Brown Fintube Co., Elyria, Ohio.

Roger H. Sherman

Roger H. Sherman, widely known oil exploration authority, died Sunday, September 5, after an illness of several months. He was coordinator of all oil producing activities of Standard Oil Co., and in that capacity had travelled widely to the major oil fields of the world.

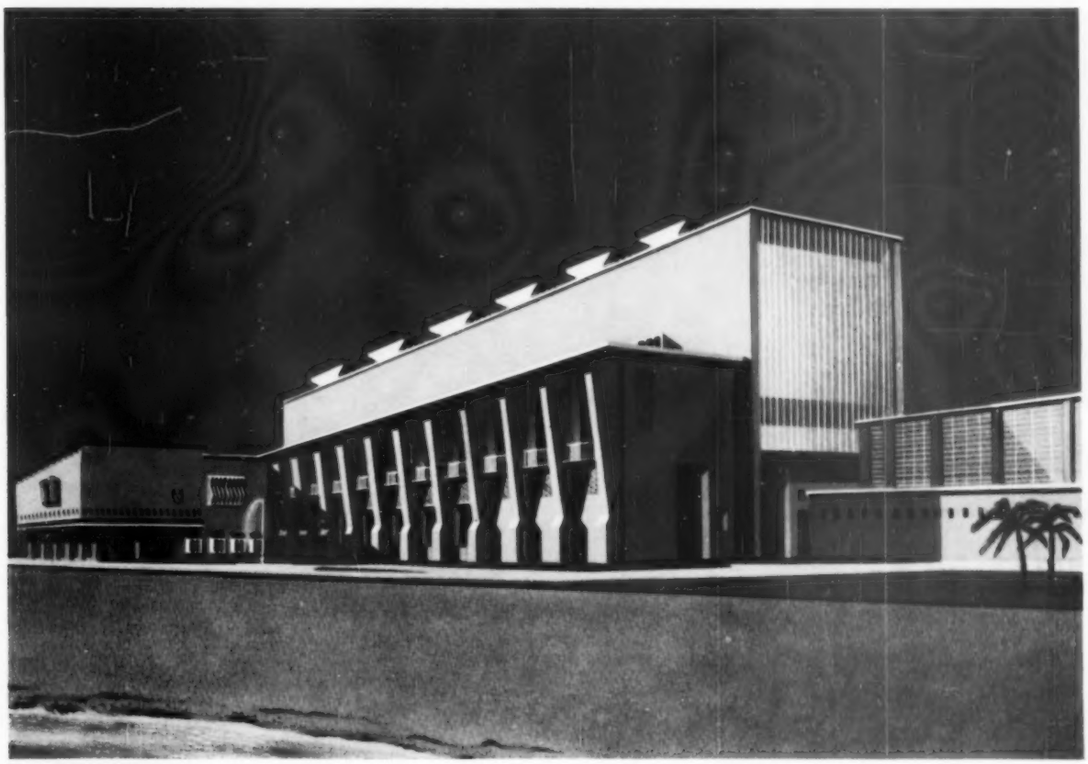
Mr. Sherman's first assignment was in field exploration work with the Huasteca Petroleum Co. in Mexico. Following the purchase of that company by Jersey Standard in 1932, he moved to Venezuela. There, from 1933 to 1946, he engaged in more field exploration for the Standard Oil Co. of Venezuela, headed that firm's exploration division and then served as a director of the Creole Petroleum Corp. In 1946 Mr. Sherman joined Creole's New York office as a vice president and coordinator of operations.

Two years later he was appointed deputy coordinator of producing operations with Jersey Standard, and effective November 1, 1949, assumed the position of coordinator. Although no longer directly connected with geological work, he maintained a deep interest in that field. He also was a director of Standard Oil Development Company and the Arabian American Oil Company.

T. C. McCobb

Thomas Clyde McCobb, a former director of Standard Oil Co. (N.J.) died October 22 at his home in Southport, Conn., after a long illness. He was 71 years old. Mr. McCobb served as director of the company from 1935 until his retirement in 1944. Earlier, he was comptroller of the company. He also served as secretary-treasurer of Imperial Oil Ltd., Canada.

Building for the Industries of the World



ELECTRICITY.

The Kuwait Town Power Station to the design
of the Consulting Engineers, Ewbank & Partners,
and Architects, Farmer & Dark, F/F.R.I.B.A.
was constructed by

THE GULF ENGINEERING COMPANY (KUWAIT) LTD.

part of the organisation of

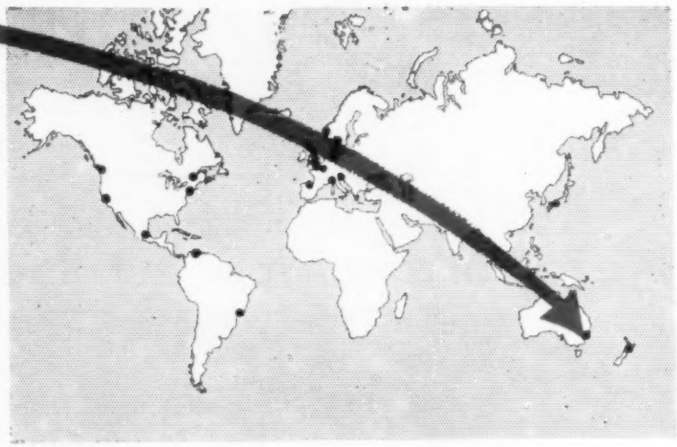
RICHARD **COSTAIN** LIMITED BUILDING & CIVIL ENGINEERING CONTRACTORS

111, WESTMINSTER BRIDGE ROAD, LONDON, S.E.1. WATERLOO 4977

BRANCHES: MIDDLE EAST · RHODESIA · NIGERIA · CANADA

International Paints

in Australia



At Sydney an associated "International" factory is making paints for a great variety of purposes. Their intimate understanding of paints suitable for the Australian market contributes in no small measure to the wealth of knowledge accumulated by "International's" world-wide organisation.

"International" have associated Companies in 15 other countries and close co-operation ensures the ability to supply the right paint for anything, anywhere. "International" products for the oil industry include METAL PRIMERS and ALUMINIUM PAINT for storage tanks; DRUM PAINTS, and ENAMELS for general purposes.

International Paints Ltd.

Head Office: GROSVENOR GARDENS HOUSE, LONDON, S.W.1

TELEPHONE: TATE GALLERY 7070 (15 LINES)

TELEGRAMS, INLAND: CORROFOUL, SOWEST, LONDON. OVERSEAS: CORROFOUL, LONDON

REGISTERED TRADE MARK

MAIN FACTORY IN U.K. FELLING-ON-TYNE

ASSOCIATED FACTORIES IN

AUSTRALIA	SYDNEY	GERMANY	HAMBURG	NEW ZEALAND	WELLINGTON
BRAZIL	RIO DE JANEIRO	ITALY	GENOA	SPAIN	BILBAO
CANADA	MONTREAL	ITALY	TRIESTE	SWEDEN	GOTHENBURG
CANADA	VANCOUVER	JAPAN	KOBE	U.S.A.	NEW YORK
DENMARK	COPENHAGEN	MEXICO	MEXICO CITY	U.S.A.	SAN FRANCISCO
FRANCE	LE HAVRE	NORWAY	BERGEN	VENEZUELA	MARACAIBO

HOLLAND—Typical of Holland's modern transportation facilities is the "Koningin Juliana." This palatial Diesel-powered ferry carries 75 automobiles and trucks and 2,000 passengers between the islands of Zeeland province. The "Koningin Juliana" is lubricated exclusively with Caltex products. Caltex is proud of its share in such advances in the transportation system of this historic land.

INDONESIA—Exploring and drilling for oil in the Minas field, Caltex employs mostly nationals, a Caltex policy in all lands. Men—like this surveyor's helper—are trained in the many skills required by the oil industry, all of which give higher income opportunities. The Republic of Indonesia benefits through development of its resources, producing new government revenues.

SOUTH AFRICA—Fabulous land of gold and diamonds, South Africa is experiencing vigorous growth and modernization. Here in the shadow of the famous "Table Mountain" is the warehouse area of the Caltex Cape Town terminal—storage place for the fine fuels and lubricants for increasing numbers of motorists who "Travel the Caltex Way."

Caltex serves the people of 67 lands

In 67 lands, across half the world, through such developments as these, Caltex is able to supply better fuels and lubricants for industry, for agriculture, and for motoring millions. These require a continual investment of funds and skills, backed by a faith in a better future for free nations.

CALTEX Petroleum Products

SERVING EUROPE • AFRICA • ASIA • AUSTRALASIA

INTERNATIONAL NEWS AND NOTES

West Pakistan Gas Processing Plant

Pakistan Petroleum Ltd. has contracted with Hudson Engineering Corp. of Houston for the design and installation of a gas gathering system and gas processing plant for the Sui gas field in the state of Baluchistan of West Pakistan. Gas after treatment in the plant will be piped by way of Hyderabad to Karachi, a city of 1.5 million people, 350 miles southwest of Sui. The whole project including the pipe line will cost about $30 million and is scheduled for completion in May 1955.

All of the plant equipment will be shipped from Houston to Karachi, a distance of 11,000 miles. The Hudson organization already has construction men in Pakistan studying means of transporting the heavy equipment over miles of roadless desert, and recruiting native labor crews.

The Sui field has a proven reserve of over two trillion cubic feet of gas. The gas processing and pipe line project will be of tremendous advantage to the whole economy of West Pakistan, through making available an ideal domestically produced fuel to replace imported coal, and providing raw material for ammonia fertilizer and synthetic cattle feed so critically needed for increasing food production.

New Platformer at BP-Hamburg

In the presence of Sir William Fraser, chairman of the Anglo-Iranian Oil Co., the opening ceremony of the Platforming unit of the BP Benzinund Petroleum-GmbH, first of its kind on the European continent, was held at Hamburg-Finkenwerder September 9. At the same time, the German subsidiary of Anglo-Iranian, the BP (formerly the Olex Co.), celebrated its 50th anniversary.

The newly erected Platformer licensed by Universal Oil Products Co. has an annual throughput of 240,000 tons of heavy gasoline. At the same time a new atmospheric Foster Wheeler distillation plant with a vacuum column (annual capacity 600,000 tons) and a bitumen blowing unit (50,000 tons annual throughput) were installed. The total capacity of the Finkenwerder plant amounts to 1.25 million tons of Iraq and Kuwait crude respectively. From this, a yield of about 28 percent gasoline, 23 percent diesel fuel, 49 percent fuel oil, four percent bitumen and two percent liquid fuel is obtained.

Royal Dutch Shell Earnings Rise

Earnings of the Royal Dutch/Shell group of companies for the six months ending June 30, 1954 and for the same period in 1953 are reported as follows:

	1954 Six Months Jan.-June	1953 Six Months Jan.-June
Net income before estimated taxation and minority interests	£124,716,009	£112,749,729
Estimated taxation	46,646,194	43,124,758
	78,069,815	69,624,971
Income applicable to minority interests	8,876,525	7,083,134
New income for the period	69,193,290	62,541,837
Equivalent in U. S. currency	$193,741,250	$185,117,150

Interests in the properties are held 60 percent by Royal Dutch Petroleum Company and 40 percent by Shell Transport and Trading Company Limited.

A. R. Gill

Public Relations Office in Trinidad

The Petroleum Association of Trinidad has established a public relations office in Port-of-Spain, the capital city. Appointed to take charge of the Association's publicity and public relations is A. Roland Gill, who has spent 17 years with Trinidad Leaseholds Ltd. and who for some years past has been chief of that company's refinery secretariat at Pointe-a-Pierre.

Puerto Rican Refinery to Build Houdry Units

Commonwealth Oil Refining Co. will build a 26,800 b/d Houdriflow catalytic cracking unit and a 3,730 b/d Houdriformer at the $24,500,000 refinery to be built on Guayanilla Bay, Puerto Rico, 15 miles west of Ponce on the island's southern coast. These will be the 99th and 100th catalytic units licensed by Houdry Process Corp. since the company's founding in 1931. The Houdriflow will be the largest constructed to date outside of continental U. S. A.

The completely new refinery, with a nominal capacity of 23,000 barrels per day, is designed for the production of high octane gasoline from Venezuelan and Middle East crudes.

The Houdriflow unit, capable of handling high sulfur stocks, is designed for 75 percent conversion utilizing recycle operation. The unit will circulate 725 tons of synthetic catalyst per hour, and has a coke burning capacity of 13,000 pounds per hour.

American Oil Experts for "Petrobras"

A contract was signed on October 1 between "Petrobras" and Drilling and Exploration Co., Inc. of Los Angeles, under which the latter undertakes to drill pioneer wells for oil and gas in any part of Brazil and to continue work on wells already drilled. It will maintain a chief engineer, who must be either a geologist or a petroleum engineer, and a staff of proved experience in Brazil to serve in the work now proceeding in the Amazon Valley, the Parana Basin and Bahia. It will train the staff of "Petrobras" in all phases of prospecting and exploitation, as well as assist those sent by "Petrobras" to United States to follow special courses. The contract is for two years, with option of renewal, and "Petrobras" reserves the right to make identical arrangements with other specialized firms.

New Directors Appointed

Davey, Paxman & Co. Ltd. of Standard Ironworks, Colchester, announce the following additions to their board of directors: L. L. Bott, general works manager; A. G. Howe, chief engineer; and T. L. Kendall, sales director of Ruston & Hornsby Ltd.

Mr. Bott joined Ruston & Hornsby Ltd. as production engineer and was promoted to deputy works manager in 1946. A year later he was appointed works manager to the engine division at Davey, Paxman & Co. Ltd. In 1951 he was appointed general works manager of the company, which included responsibility for the boiler and general engineering division. Mr. Bott is a member of the Institution of Production Engineers and sits on the Eastern Counties Section Committee of the Institution.

Mr. Howe started at Davey, Paxman & Co. Ltd. in 1916, where he served his apprenticeship. He later worked for other companies, but returned in 1936, and was given charge of the design and development of the Vee type engine department and was appointed chief diesel engineer in 1940 for design, development and research. More recently, he was appointed chief engineer of the company, covering the development of all its products.

Product Prices Raised in Peru

By decree of September 20, the price of motor spirit in Peru was increased to 1.90 soles per gallon (approximately 10 cents U.S.), including about 3½ cents of taxes. Prices of kerosine, diesel and residual fuel oil were fixed at 9.95; 1.05 and 0.80 soles per gallon respectively, including freight to Lima-Callao, corresponding to a price for residual fuel oil of around four cents U.S. per gallon.

These three products are exempt from tax. Increased domestic consumption now absorbs around 70 percent of gasoline production and is in excess of the domestic supply of industrial fuel, making it necessary to import about 600,000 barrels during the present year. Prices are to be revised every six months according to the crude quotation on the world market and refining cost.

Trinidad Fights Water Pollution

Harbor authorities of Trinidad have asked local shipping representatives to warn the captains of visiting vessels against pollution of coastal waters by discharge of oil or other liquid ballast. One of the difficulties of the marine police in enforcing local regulations applying to such action is the brief period spent in port by tankers and other cargo vessels. To assure conviction of violators, it is necessary to submit evidence of the injurious character of the discharge. By the time this can be done, the offending vessel has departed. The appeal just issued, it is hoped, will result in a greater degree of cooperation by visiting craft.

New Miniature Driller

The Gh. Gheorghiu-Dej Machine & Oil Equipment plant at Tirgoviste, Romania, is manufacturing a new "AVB 100" miniature well driller. It can drill up to 100 meters, and is designed to assist geologists in research.

Caltex Production

Crude oil production in Bahrain for the month of August was 939,213 barrels. Crude production from the company's field in Indonesia was 1,859,876 barrels.

ACTIVE ALUMINA

AND CATALYSTS FOR INDUSTRY . . .

Spence type A active alumina is a powerful dehydration catalyst and is also an excellent activating carrier for a wide range of mixed catalysts.

Spence catalysts are hard, porous and active, and can be prepared, in either pellet or granular forms, to the customer's individual research or production requirements.

CHEMICALS FOR INDUSTRY

5063

PETER SPENCE & SONS LTD. • WIDNES • LANCS. ALSO AT LONDON & BRISTOL

No Customs Increase

Vienna officials announce that it is not intended to raise the customs taxes on various oil imports, as urged by a group of Austrian producers, nor to restore the customs tax to prewar levels, as demanded by consumers.

During June, a group of Austrian oil firms asked for increased customs taxes on imported products: 28 percent of the gasoline purchase price, 29.2 percent for kerosine, 31.6 percent for diesel fuel, and 34.2 percent for fuel oil. Various taxes on oil products in Austria amount to 56 percent of the total retail price, making Austria the second-highest among European countries in taxes on liquid fuels. Italy is highest, with 67 percent, and Ireland lowest with 39 percent. The lowest tax on the continent is in Belgium, which has 42 percent.

Bolivia Pipe Line to Argentina

Because its increased output will permit export of crude, Yacimientos Petroliferos Fiscales Bolivianos has awarded a contract to Williams Brothers Inc. for construction of a 6⅝ inch pipe line about 150 miles long from the Camiri field to Yacuiba, railhead of the Argentine railways on the border. Pipe will be supplied from Germany.

YPFB's output is expected to reach 10,000 b/d by the end of the year, and according to a statement of the Bolivian government, the export of 2,500 b/d for a term of three years has been agreed upon with Argentina.

Glenn McCarthy's second well on Los Monos structure, 4,500 feet deep, is reported to have yielded 100 b/d in the test. Increased drilling is planned by employing a second rig.

German Oil Imports

In the first half of 1954, total oil imports into Western Germany were a third higher than in the same period a year ago, rising to about 21 million barrels. Imports from the Soviet zone of East Germany totaled about 300,000 barrels, which was approximately the same amount as in the previous year. Of the oil imported, 89.6 percent was crude and 10.4 percent refined products.

Crude imports totaled 1,542,407 tons, of which 579,113 came from Saudi Arabia, 204,529 tons from Venezuela, 41,111 from Mexico, 387,298 from Iraq, and 330,356 from Kuwait.

In the first half of the year Germany exported 275,468 tons of mineral oils, including brown coal tar.

Ras Tanura Pier Extension

Arabian American Oil Co. is extending its north pier at Ras Tanura at a cost of $4,250,000 to accommodate increased tanker shipping schedules and larger tankers. The extension will be 800 feet long and 100 feet wide. It will feature a rubber fender system to prevent damage.

Two berths are being prepared to service 45,500-ton super-tankers with a length of 750 feet and a beam of 120 feet. Berths will be 45 45 to 50 feet deep. Completion of the pier extension is planned for March 1, 1955.

Test Well on Mafia Island

A test will be drilled on the island of Mafia, off the coast of Tanganyika, by the D'Arcy-Shell Petroleum Co. of Tanganyika, a joint enterprise of the Anglo-Iranian and Shell groups, which has been carrying out geological and geophysical surveys over wide areas of East Africa since 1951. The test may be drilled to a depth of 12,000 feet.

German Auto Registration

Motor vehicles in West Germany increased 5.3 percent in the second quarter of 1954, according to the Federal Office for Motor Traffic. Total was 4,693,316 on July 1, consisting of 2,300,731 motorcycles, 1,391,278 passenger cars, 24,664 busses, 572,694 trucks, 376,040 tractors and 27,909 other vehicles.

G. P. Daley

Continental Export Representative

The Continental Supply Co. has appointed George P. Daley export sales representative in the South American countries of Colombia, Ecuador, Peru, Chile and Bolivia. He will establish his headquarters in Barranquilla, Colombia, and will operate under the direction of the company's New York export office. Mr. Daley joined Continental six years ago and for the past two years has served as city salesman in Houston.

Russian Crude Production

Crude production in Russia increased ten percent in the first half of 1954, according to data supplied to the United Nations by the Central Statistical Administration of the Council of Ministers of the U.S.S.R. Output was reported 37.5 percent greater than in 1951.

Taking 1951 production as a base, the Statistical Administration reported 1950 output at 89 percent, 1952 at 112 percent and 1953 production at 125 percent.

The administration does not issue figures on actual volume of crude output, but such figures are given out from time to time by Soviet officials. Most recent report was for 1953, when daily average production was placed at 1,040,000 barrels. Applying the percentage figures issued by the Statistical Administration, Russian output in recent years and the current level may be calculated as follows:

YEAR	BARRELS DAILY
1950	745,000
1951	833,000
1952	935,000
1953	1,040,000
1954	1,144,000

Austrian Refinery Operations

About 38,000 barrels of crude a day are at present processed by the seven Austrian refineries, five of which are operated by the Soviets. The Soviet works are responsible for about 30,500 b/d, including 7,200 b/d at Schwechat, 6,600 b/d at Korneuburg, 6,600 b/d at Lobau, 5,800 b/d at Moosbierbaum and 4,000 b/d at Voesendorf. Throughput of Shell at Floridsdorf is about 4,000 b/d and of Socony-Vacuum at Kagran about 3,600 b/d.

Pemex to Build Gasoline Plant

Petroleos Mexicanos will invest 87,500,000 pesos in construction of an absorption plant in the State of Tabasco, it was disclosed by the government oil monopoly's Projects Office. The plant is intended to increase production of gasoline and natural gas in southern Mexico, where Pemex spokesmen said the chief problem is the lack of communications.

Japanese Platformer

The fourth UOP Platforming unit to go into operation in Japan within the past year went on stream recently at the refinery of the Mitsubishi Oil Co. at Kawasaki. Startup of the 1,500-barrel unit marked a major step toward completion of a general refinery expansion program.

The Platformer at Mitsubishi is designed to process straight run naphtha, derived from Arabian crudes which are brought by tanker from the Middle East oil fields, and to convert it into a high octane motor fuel blending material. The unit presently is producing a Platformate having an octane of 76 to 80 F-2 clear.

Universal Oil Products Co. designed, engineered and licensed the Platforming unit, which was built by the Japan Gasoline Co.

Buys Interest in Cuba

The Cuban-Canadian Petroleum Co. of Cuba, a wholly-owned subsidiary of the American Leduc Petroleum Co. Ltd., of Edmonton, has purchased a 50 percent interest on a checkerboard basis in the Echeverria field, first commercially producive oil field in Cuba. The rights, covering 15,000 acres, were acquired from Petroleria Jatabonico, original grantees of the concession in Camaguey province.

Cuban-Canadian has moved into Cuba on a major explorative scale. The company last August took a 30-year lease on 4,992,700 acres spotted in five provinces across the island. A significant part of the acreage involves tideland rights.

Middle East Crude Production

The following crude oil production figures for the month of August 1954 are announced:

	AUG. 1954	JAN.–AUG. 1954
	LONG TONS	LONG TONS
Iraq Petroleum Co. Ltd. (Kirkuk Field)	2,027,910	15,615,844
Basrah Petroleum Co. Ltd. (Zubair Field)	427,562	2,889,422
Mosul Petroleum Co. Ltd. (Ain Zalah & Butmah Field)	109,355	865,928
Qatar Petroleum Co. Ltd. (Dukhan Field)	385,920	3,054,734
Kuwait Petroleum Co. Ltd.	4,236,720	30,280,177
Aramco	3,850,332	31,545,404
(U.S. Barrels)	28,492,455	232,762,587

Pemex Discoveries

Petroleos Mexicanos has discovered 15 new oil and gas fields this year, according to an announcement by Senator Antonio J. Bermudez, Pemex director. Pemex has drilled 315 wells this year and total footage has increased 16 percent to 1,600,000 feet.

Most important find of the year was the new field at Tecolutla, Vera Cruz. Miguel Hidalgo y Costilla No. 1 came in on August 15 as a 3,000 b/d condensate producer at 7,500 feet. The well was scheduled to go on regular production October 15. It is located near the Gulf shore and may indicate offshore as well as onshore production possibilities.

Yugoslav Industry Expands

Refining capacity in Yugoslavia will be increased to 18,000 b/d in 1955, according to a recent announcement. Current capacity is 11,600 b/d. The oil administration hopes to bring Yugoslav crude production to 3,300 b/d this year and has set a target of 6,000 b/d for 1955.

Selenitza Bitumen Pit Production Increases

Selenitza Mine, in Valona Province, Albania, was recently credited with a production of 50 metric tons of bitumen per day for 1953, equivalent to 117 percent of the 1938 yield.

New! Westinghouse DC Rectifier Welder

with Improved "Arc-Drive" Control

Here is the answer to industry's pressing need for maximum welding performance at minimum cost. The Westinghouse DC Rectifier Welder features *improved* Arc-Drive Control and thermal overload protection.

Exclusive Arc-Drive is instantaneous in response to, and recovery from, transient changes in the welding arc. The control can be adjusted for *any given job.* Thermal overload protection automatically cuts out the welder before harmful high temperatures can be reached.

Such difficult jobs as pipe welding, field erection, deep groove welding and vertical and overhead application are handled easily and with more efficiency by Westinghouse DC Welders equipped with Arc-Drive Control.

For complete information—write today for your free copy of illustrated Booklet B-6129.

Economy!

Compared with the conventional motor-generator type, the new DC Welder pays for itself—in power savings alone—in less than 3½ years of operation on an average duty cycle.

YOU CAN BE **SURE** ...IF IT'S

Westinghouse

WESTINGHOUSE ELECTRIC INTERNATIONAL COMPANY

40 Wall Street, New York 5, U. S. A.

THERE'S NO MAGIC ABOUT IT

DON'T BE SURPRISED, the next time you're traveling through Lebanon, if you see a sign at a refinery which reads, "Built by Procon." You may run across one on a chemical plant in England. You'll find them in Australia, Canada, Germany, Belgium, the Canary Islands, and in 18 of the 48 United States.

Yes, Procon gets around. And Procon's reputation gets around, too . . . a reputation for dependability . . . worthwhile economies . . . on-time completion . . . and long-time satisfaction in the construction of processing facilities for chemicals, petrochemicals, and petroleum products.

No magic . . . just sound, common sense . . . practical engineering ability . . . field-trained personnel . . . and experience which encompasses the world.

When you're ready to discuss your process construction plans, we'd welcome an opportunity to tell you more about Procon.

PROCON *Incorporated*

PROCESS CONSTRUCTION

1111 MT. PROSPECT ROAD, DES PLAINES, ILLINOIS, U. S. A.

AFFILIATED COMPANIES

PROCON (CANADA) LIMITED
40 ADVANCE ROAD
TORONTO 18, ONTARIO

PROCON (GREAT BRITAIN) LIMITED
112 STRAND, LONDON, W. C. 2

OIL COMPANY STAFF CHANGES

DANIEL L. HUSSEY, who has been general superintendent of the Bayway refinery of Esso Standard Oil Co. since January 1, 1953, has accepted a loan assignment as head of the refinery survey party at the Abadan refinery in Iran.

Mr. Hussey came to Bayway in 1925 as a student engineer. He was named assistant department head of the chemical products plant in 1934 and became department head in 1943. From 1945 to 1949 he was process superintendent of the Bayway refinery. In 1949, Mr. Hussey accepted a loan assignment as superintendent of Lago Oil and Transport Co., Aruba refinery, Dutch West Indies, returning to Bayway in 1951 as assistant general superintendent.

G. R. Murrell, head of the petroleum products division of the Baton Rouge refinery, has succeeded Mr. Hussey as general superintendent of the Bayway refinery. Mr. Morrell joined the Standard Oil Co. of Louisiana in 1929. Moving through various engineering assignments, he became head of maintenance and construction in 1939. In 1945 he was made assistant process superintendent, and in February, 1952, head of the petroleum products division, which position he leaves in coming to Bayway.

WILLIAM S. FLOYD of Shell Oil Co. has joined the Office of Defense Mobilization as assistant director for materials, it is announced by Arthur S. Flemming, director of the ODM. Mr. Floyd will be responsible for determining the quantity of materials required to meet the nation's defense and stockpile needs as well as for the development of materials expansion and procurement programs for mobilization.

Since 1950, Mr. Floyd has been manager of Shell's purchasing department, responsible for all purchasing and stores activities on the Pacific Coast for the Shell Oil Co., Shell Chemical Co., and Shell Development Co. He joined the engineering department of the company in 1929 and in 1936 was transferred to its purchasing and stores department.

Mr. Floyd is a native of San Francisco, and graduated in 1928 from the University of California with a degree in Civil Engineering. He is past president of the Purchasing Agents Association of Northern California and is a member of the National Association of Purchasing Agents.

Elmer H. Weaver, who has held the post at ODM, is leaving to return to his company, Union Oil Co. of California, it was announced.

C. W. REED, fuel oil sales supervisor of Tide Water Associated Oil Company, retired on September 30 at the conclusion of 35 years service. He joined the company in 1919 as a salesman of heavy fuel oil. In 1929 he was made sales supervisor and acting assistant manager of the fuel oil sales department, was promoted to wholesale sales manager in 1936 and became head of the sales division in January 1942.

EDWARD F. MORRILL, general manager of Standard Oil Co. of Ohio's new petrochemical department, has anounced appointments of three Sohioans to new posts in the organization.

Donald G. Stevens, formerly chief, technical service division, manufacturing department, will become plant manager of the new $17 million Lima plant. Construction of the Lima petrochemical plant will begin soon and be completed in 1955.

Granville B. Ryan, formerly assistant to Sohio's vice president for manufacturing, will become manager of the market and production development division.

William H. Ringler, formerly senior engineer, technical service division, will become assistant to the manager of market and product development division.

CAPTAIN SPENCER F. HEWINS, formerly of the United States Coast Guard, has been appointed marine equipment superintendent for Continental Oil Company's southern region offshore marine department, Houston.

W. W. SCHEUMANN, vice president of Cities Service Research & Development Co., has appointed Dr. R. O. Norris as laboratory director of the Petty's Island laboratory in New Jersey. He succeeds Dr. R. D. Kleene, resigned.

H. E. HUGHES, chief engineer of Shell Chemical Corporation's Houston plant, has been appointed to the plant's new post of assistant superintendent, technical. In the new position, Mr. Hughes will be charged with the establishment of a new engineering development department in the plant to apply technical skills and advanced engineering know-how to problems involving plant construction, inspection and maintenance. He will also assume administrative responsibility for the technological department and the plant laboratories.

J. W. Hyde, now assistant chief engineer, will succeed Mr. Hughes as chief engineer. C. W. De Long, of the company's head office construction group, will replace Mr. Hyde.

M. W. NICHOLAS, formerly assistant to the manager of refining of Ohio Oil Co., has been appointed refining staff manager. He will be responsible for coordinating the activities of the chief chemist, technical advisor and analytical staff; for negotiating or assisting in negotiating contracts with the government, engineering firms and others; and for liaison with the marketing department.

R. W. S. Musgrave has advanced from chief refining engineer to refining engineering manager. Mr. Musgrave's responsibilities will include functional control and general coordination of all refining facilities and advising on all engineering aspects of refining management problems.

JOHN D. ROGERS, a director and vice president of Esso Shipping Co., has been elected executive vice president and John M. B. Howard has been elected a director and also vice president. Mr. Rogers has been with the Jersey Standard organization for 38 years; Mr. Howard for 21 years.

Mr. Rogers joined what was then known as the company's marine department in 1916. He subsequently held executive positions overseas in the Panama Canal Zone area and served as joint general manager of Esso Transportation Co. Ltd. in London. In 1948 Mr. Rogers returned to New York to become assistant general manager of the marine department, and when the Esso Shipping Co. was organized in 1950, he was elected a director and vice president.

Mr. Howard, a graduate of the United States Naval Academy, started as a deck officer on company tankers in 1933, later receiving his master's papers. After executive service in shore posts at New York, Baltimore, Baton Rouge, Houston, Caripito, Venezuela, and Aruba, N.W.I., he became assistant general manager of the Esso Transportation Co. in London. From this post in 1948 Mr. Howard went with another Jersey Standard affiliate as assistant manager of Standard-Vacuum Oil Company's marine department. In 1950 he was named general manager of that department, the post he held prior to his new position.

F. E. SMITH has been elected a vice president of The Ohio Oil Co. and appointed general manager of production. The new appointment frees W. B. Emery of direct operational responsibilities and permits him to give full time to coordination and guidance of exploration and production. Mr. Emery is a director and vice president.

Mr. Smith formerly was assistant manager of production. He has been with the company for 40 years. His first job was as office boy in Marshall, Ill. After warehouse and later foreman duties in Illinois and Wyoming and a year in Utah, he took charge in 1921 of the first gas well Ohio Oil drilled in the Rock Springs, Wyo. area. He was transferred in 1927 to California where he rose to general superintendent of production of the Los Angeles division. He moved to Findlay in 1944 as general superintendent of the production department, and in 1950 was named assistant manager.

G. F. Bish, division manager at Tulsa, Okla., and G. F. Poe, general superintendent of production, have been appointed assistant managers of production with headquarters at the general office in Findlay. Mr. Poe is a 31-year Ohio oil veteran and Mr. Bish has also been with the company 31 years.

E. B. Stewart, division manager at Terre Haute, Ind., will succeed Mr. Bish as a manager of the Tulsa division and J. D. Anderson, assistant division manager at Houston, Tex., will move to Terre Haute as division manager.

I. G. Burrell, assistant to the manager of production at Findlay, has been appointed assistant division manager of the Houston division.

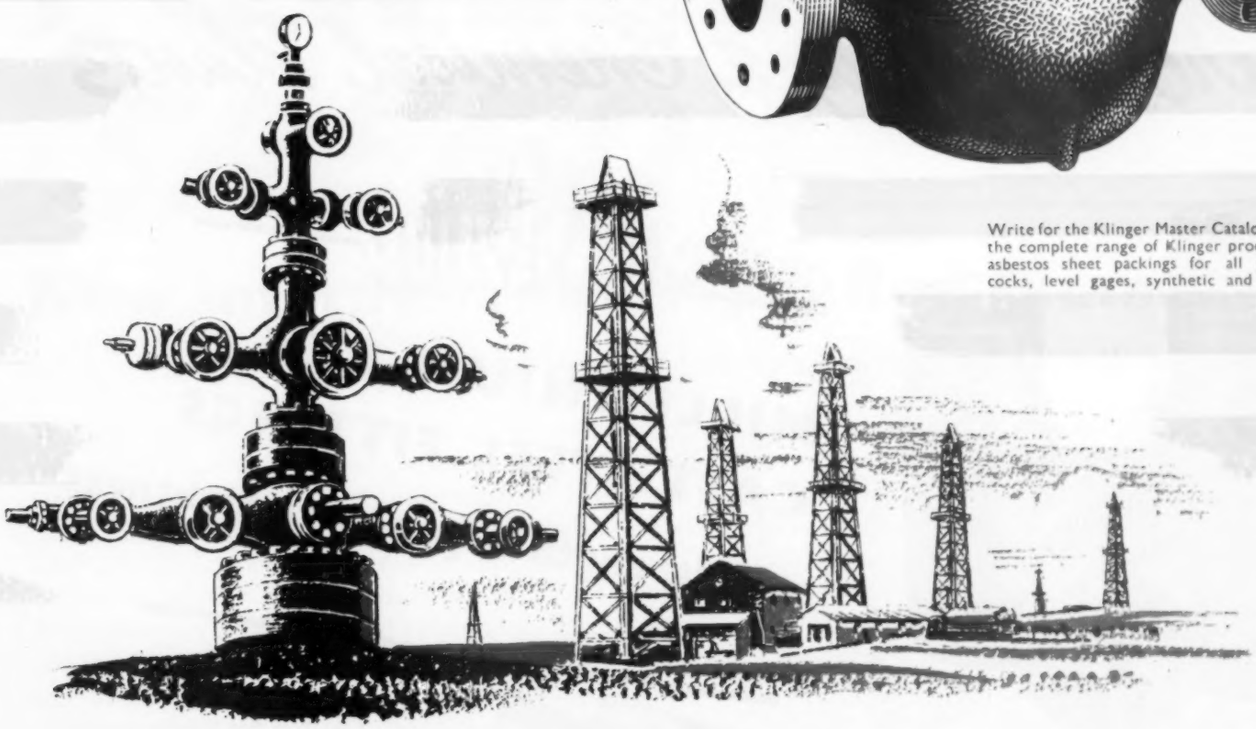
O. V. Henry, division superintendent of production at Houston, succeeds Mr. Poe as general superintendent of production in the general office.

J. A. Grimes, Jr., assistant Houston division superintendent of production, advances to division superintendent, succeeding Mr. Henry.

F. E. Smith *G. F. Bish* *G. F. Poe* *E. B. Stewart* *J. D. Anderson* *I. G. Burrell* *J. A. Grimes, Jr.*

INSTALL KLINGER VALVES

Klingerise **your plant**



Write for the Klinger Master Catalog which describes the complete range of Klinger products, compressed asbestos sheet packings for all purposes, valves, cocks, level gages, synthetic and silicone rubbers.

RICHARD KLINGER LIMITED, KLINGERIT WORKS, SIDCUP, KENT, ENGLAND

Agents throughout the World

Manufacturing Licensees for Canada

JOSEPH ROBB & COMPANY, LIMITED
5575, COTE ST. PAUL ROAD, MONTREAL, 20, CANADA
Telephone: WILBANK 3181 Cable: ROBCO
Branches at: SYDNEY, N.S., HALIFAX, N.S., OTTAWA, Ont., TORONTO, Ont., HAMILTON, Ont., WINNIPEG, Man., EDMONTON, Alta., VANCOUVER, B.C.

Manufacturing Licensees for U.S.A.

THE KLINGER CORPORATION OF AMERICA
95, RIVER STREET, HOBOKEN, NEW JERSEY, U.S.A.
Telephone: HOBOKEN 2-7915 Cable: KLINGDALE
New York
Telephone: WHITEHALL 3-8996

Zeb Mayhew

ZEB MAYHEW, who joined the Standard Oil Co. (N.J.) organization in 1937 as a helper on a drilling rig, has been appointed deputy coordinator of all producing activities of the company. Mr. Mayhew joined Humble Oil & Refining Co. in 1937. From 1939 until 1953, he was with Creole Petroleum Corp., first as a geologist and later as district superintendent of the fields at Cumarebo and at La Salina in Venezuela. Mr. Mayhew came to Jersey Standard's producing coordination department in New York in 1953 as a regional executive concerned with Latin American matters.

JAMES G. BALDWIN has been named manager of industrial ammonia sales for Brea Chemicals, Inc., subsidiary of the Union Oil Co. of California.

W. M. PAGGI has been promoted to regional superintendent, operating department, at Houston, Texas for Sun Oil Co. He formerly was assistant superintendent at Houston. He succeeds J. O. McPherson, veteran Sun man who retired recently after more than 45 years of company service.

PAUL N. TEMPLETON has been named supervisor of tariffs and oil movements and will head a newly established oil movements department for Magnolia Pipe Line Co. The new department will make all shipping arrangements for crude oil and petroleum products transported by pipe line. Magnolia Pipe Line Co. has more than 9,000 miles of trunk, gathering and products lines which extend into nine states throughout the southwest and midwest.

P. N. Templeton

J. W. Glass, Jr.

JULIAN W. GLASS, JR., was named president of Panhandle Producing Co. at a recent meeting of directors. He has served as vice president and director of the corporation since the death in 1952 of the late J. Wood Glass, organizer and first president. In addition to his duties as president, Mr. Glass, Jr., is also a director of the corporation. Other officers and directors are: F. Wallace Hall, vice president; Irene Stimson Cox, secretary-treasurer; Eva Payne Glass; and A. A. Eason.

EDWARD N. MULLER, assistant treasurer of Tide Water Associated Oil Co., has retired after serving more than 33 years with the firm. He joined Tide Water Associated in 1921 as credit manager of the Tide Water Oil Sales Corp. He became regional treasurer in charge of eastern division financial operations in February 1940.

For Oil Refinery & Chemical Plants

Special Two-hole Reducing Terminal with Flanged Side Outlet.

MILLENNIUM KEY

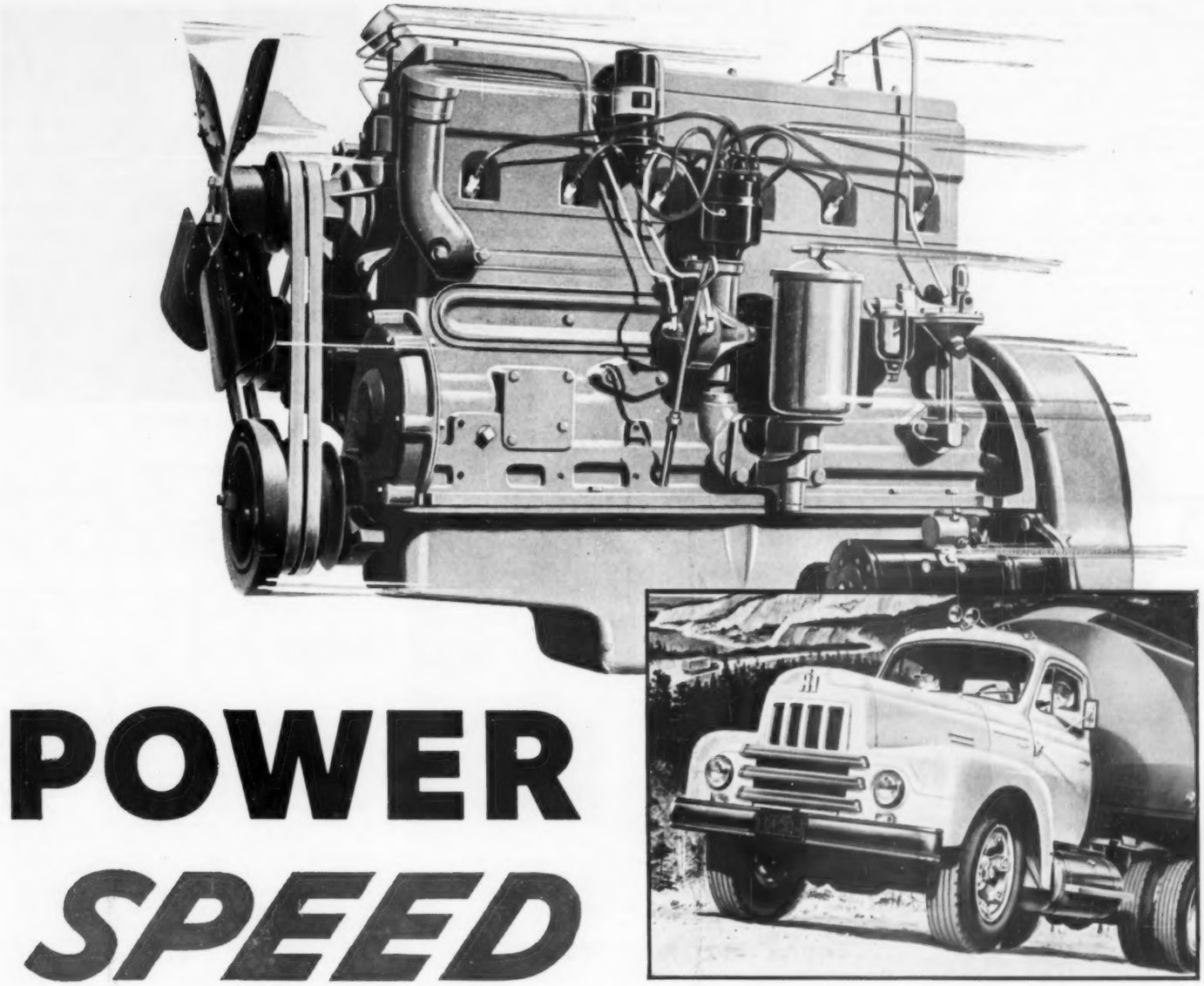
MILLENNIUM-KEY CAST STEEL FITTINGS

for strength & pressure tightness

These four bulletins give full technical information on each type of fitting we can supply. Please write for them.

Lake & Elliot Ltd.
BRAINTREE · ENGLAND

L5785



POWER SPEED

New International Royal Red Diamond 501

the largest, most powerful International-built truck engine

■ Newly designed and engineered from the block up, this mighty power plant combines extraordinary responsiveness, dependability and economy. The Royal Red Diamond 501 valve-in-head gasoline engine with over 500 cubic inch displacement delivers 201 hp at 3000 rpm and 430 lb.-ft. torque at 1400 to 1800 rpm. Laboratory-proved and road-proved, the 501 engine assures profit-minded truck buyers unmatched economy. Peak performance at all times – in heavy city traffic, on the open highway or in mountainous country – means payload profits with the new 501 engine.

With components coordinated to meet your requirements – 5 or 8 speed transmissions, 3-speed auxiliary transmission and single or 2-speed axles – the 501 engine is standard equipment in the International R-220 series and optional in the R-210 and the 6-wheel RF-210 series trucks. Gross combination weights up to 70,000 lbs. can be hauled with ease under normal highway operating conditions.

For power, speed and bigger payloads at low-cost per mile operation, see your IH truck dealer and find out how the new International 501 Engine can build profits for you. International Harvester Export Company, 180 N. Michigan Ave., Chicago 1, Ill., U.S.A.

INTERNATIONAL TRUCKS

G. HAROLD OSBORNE and **HOWARD V. SMITH** have been elected vice presidents of the Kendall Refining Co., Bradford, Pa.

Mr. Osborne is in charge of marketing and Mr. Smith of refining. Mr. Osborne joined Kendall in 1933 as a refinery employee and later transferred to sales. In 1950 he was made general manager of sales and in 1951 was elected a director. Mr. Smith joined the Kendall organization as refinery manager in April 1943. He was elected a director the following year.

R. M. DUNGAN, Ventura, Calif., has been appointed division geologist for Continental Oil Company's southern region offshore marine department. He formerly was a division geologist for Conoco at Ventura. Dr. Dungan joined Conoco in 1948 as a geologist in California and was promoted in 1952 to division geologist at Ventura.

J. B. LASSITER, JR., has joined the staff of Lion Oil Company's reservoir engineering department in El Dorado as senior engineer in the reserve and economics section. Mr. Lassiter formerly was chief engineer of Marine Oil Co. in El Dorado.

L. K. KING, Ponca City, Okla., supervisor in Continental Oil Company's geophysical section, has been appointed assistant chief geophysicist for the Egyptian-American Oil Co. Robert H. Greenwood, Ponca City, was named assistant controller and W. D. Francisco, Casper, Wyo., chief technician in Egyptian-American's mine disposal section. All three men will make their new headquarters in Cairo, Egypt.

Egyptian-American Oil Co., a subsidiary of Continental Oil Co., is now exploring for oil in Egypt in a 75,000 square mile concession about the size of the State of Oklahoma.

B. B. Howard

BUSHROD B. HOWARD, an authority on domestic and foreign tanker operations who helped develop a program to expedite oil and other types of war cargoes during World War II, has retired from Standard Oil Co. (N.J.) after 34 years with the Jersey organization, nine as a director.

Joining Jersey Standard's marine operating division in 1920 following his naval service in World War I, Mr. Howard took over the duties of European representative for the shipping company in Paris two years later, becoming managing operator of Société Auxiliaire de Transports in 1925, and later director of L'Economique Société Anonyme and Bedford Petroleum Co., affiliates of Jersey Standard. He became the London representative of the former Standard Shipping Co. in 1929, coordinating the company's European marine operations.

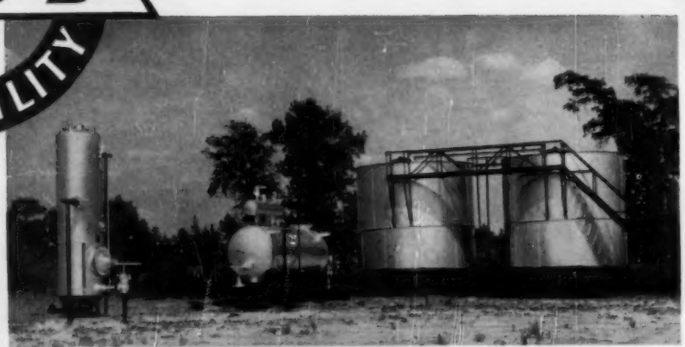
Mr. Howard was made assistant manager of the marine department at New York in 1938 and a year later was appointed general manager of the department, which is now the Esso Shipping Co. He was called to London in 1941 as a representative of the United States Maritime commission to aid in working out plans for expediting tanker cargoes in the heavily bombed British ports. The following year, at the request of the War Shipping Administration, he spent considerable time in West Africa, India, the Middle East and the Suez area to devise methods for speeding up the movement of cargoes of essential materials to the war theatres. In 1943 he was elected president of War Emergency Tankers, Inc.

W. JACQUE YOST has been appointed research director for Ohio Oil Co. He will manage Ohio's projected research laboratory. Dr. Yost was formerly technical advisor to the director of research in Magnolia Petroleum Company's field research department, Dallas.

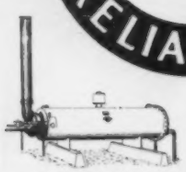
W. J. Yost

EFFICIENCY
BS & B
RELIABILITY

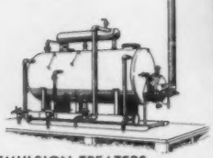
For Faster Payout, Greater Profits And A More Efficient Operation . . .



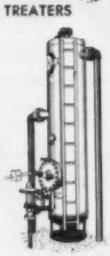
This typical lease operation employs a BS&B Vertical Separator and a BS&B Horizontal Emulsion Treater—both equipped with BS&B "Climax" Automatic Controls. The two 500 bbl. Bolted Steel Tanks and the "Safwalk" Steel Stairway and Walkway are also BS&B.



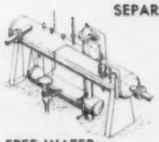
HEATERS



EMULSION TREATERS



SEPARATORS



FREE WATER KNOCKOUTS

STABILIZERS

CLIMAX CONTROLS

SAFETY HEADS

. . . Equip Your Lease 100% BS&B!

For more than six decades—almost as long as there has been an oil industry—BS&B has enjoyed a position of leadership in the manufacture of quality oilfield production equipment.

This leadership has been born of our never-ending effort to improve on the "established" ways of doing things, and of our continuing program of engineering research, pioneering and the development of equipment which outperforms all others—with faster payout and greater profit for you!

Next time you put a lease on production, why not do as many other profit-wise operators are doing these days —equip your lease 100% BS&B!

BS&B offers a complete line of oilfield production equipment. For detailed information, consult your BS&B representative—or write to us direct.

From BS&B for the Petroleum Industry

Bolted Steel Tanks . . . Welded Steel Tanks . . . Wood Tanks . . . Oil and Gas Separators . . . Free Water Knockouts . . . "COLD-FRAC" Low Temperature Separation Systems . . . Stabilizers . . . Emulsion Treaters . . . Heaters . . . Gas Dehydrators . . . Gas Desulfurizers . . . Chemical Feeders . . . Walkways and Stairways . . . Automatic Control Equipment . . . Safety Heads . . . Special Fabrication.

BLACK, SIVALLS & BRYSON, INC.

Dept. 12-CQ12
7500 East 12th Street, Kansas City 26, Missouri
Cable Address: Exblack, K. C.

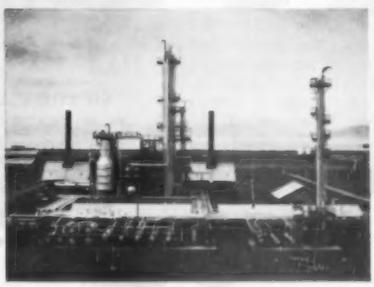
another complete refinery . . .

BATANGAS BAY, PHILIPPINE ISLANDS

This new Caltex refinery comprising Crude Distillation, Model IV Fluid Catalytic Cracking, Liquid-Phase Catalytic Polymerization and Propane Decarbonization is now "on stream". It is the

"first in the Philippines"

The Model IV Fluid Catalytic Cracking unit



The two-stage Crude Distillation unit

FOSTER WHEELER

165 BROADWAY, NEW YORK 6, NEW YORK

N. Y. Ruth

NELSON Y. RUTH, a director of The Carter Oil Co., has been named an assistant coordinator of the producing department of Standard Oil Co. (N.J.). Mr. Ruth joined Carter in 1927. He was made manager of the land department in 1946, and in 1947 became manager of the exploration department. He was elected a Carter director in 1953.

FRED POWELL has been named to head the manufacturing department of Standard Oil Co. of California, succeeding O. N. Miller, now a vice president of the company. J. E. Gosline takes over the producing department, which previously operated directly under vice president J. E. Toussaint.

Mr. Powell was formerly president of California Research & Development Corp., a Standard subsidiary which was dissolved earlier this year upon completion of its contracts with the Atomic Energy Commission. In the interim, he has been serving as assistant manager of manufacturing with supervision over chemical production. He is a former manager of the Company's El Segundo refinery.

Mr. Gosline, who previously served as assistant general manager of producing, has been with Standard since 1933. Prior to joining the headquarters management of the production department, Mr. Gosline headed up the southern district of this organization in Los Angeles. He is a past president and one of the founders of the Petroleum Production Pioneers.

W. C. McCAMMON has been named assistant to the president of Standard Oil Co. of California, a new position. Mr. McCammon, who has served as assistant comptroller of the company since 1944, joined Standard in 1932 and has spent his entire business career with the company.

W. C. McCammon

A. C. WILKINSON, vice president and general manager of Continental Pipe Line Co., Ponca City, Okla., has been promoted to the newly-created position of senior vice president as part of a general realignment of top personnel. Seven others were promoted as follows:

John L. Kelly, Wichita Falls, Tex., North Texas district superintendent, promoted to the newly-created position of vice president in charge of operations.

John D. Morrow, Ponca City, administrative assistant to the president, promoted to the new position of coordinator and assistant to the president.

F. C. Whiteside, Ponca City, chief engineer, promoted to the new position of manager of development and technical advisor.

William K. Burns, Ponca City, senior office engineer, promoted to chief engineer, succeeding Mr. Whiteside.

Earl B. Webster, Ponca City, assistant to the vice president and general manager, promoted to the new position of supervisor of oil movements.

C. Jay Plett, Ponca City, chief clerk, promoted to the new position of supervisor of industrial relations.

R. L. Sanders, Spokane, Wash., office manager for Yellowstone Pipe Line Co., promoted to chief clerk for Continental Pipe Line Co., succeeding Mr. Plett.

V. V. Horner

VICTOR V. HORNER, Denver, Colo., has been named a research engineer in the drilling methods section of The Carter Oil Co. He first joined Carter shortly after his 1935 graduation from the University of Tulsa as a member of an inventory crew and advanced to district petroleum engineer in Powell, Wyo., the position he held until 1945. For the past nine years he has served as division engineer and secretary-treasurer for two major petroleum firms.

E. L. BALDESCHWIELER, director of the analytical laboratories at the Esso Research Center, Linden, N.J., and an employee of the company for 32 years, was feted at Antoine's restaurant at New Orleans October 22 by the American Petroleum Institute Committee on Analytical Research. Recognized as among the top analytical chemists in the oil industry, Mr. Baldeschwieler came to the United States in 1907 from his native Switzerland. One of his first laboratory jobs was bottle washing for a large pharmaceutical firm. In 1922 he joined the development department of Standard Oil Co. (N.J.) as an analytical chemist.

CALVIN T. THOMAS has been named manager of the transportation department of General Petroleum Corp. He continues to supervise the company's marketing department transportation facilities and personnel, which have been merged and consolidated with the transportation department. He has been manager of automotive equipment for the marketing department since 1948.

V. N. Drew

VERNE N. DREW has been appointed general manager of the marine department of American Oil Co. to succeed James P. Patterson, who retired after nearly 37 years with the company.

Mr. Drew, who formerly was marine operating manager, has been associated with marine activities for 36 years, served in the Navy during World War I and is a lieutenant commander in the naval reserve. He joined the company in 1936 as a chief engineer and inspector of new marine construction. In 1941 he took over a war emergency position of principal machinery inspector and later, co-ordinator of East Coast shipbuilding for the U. S. Maritime Commission.

He returned to the company in 1943 as port engineer in the New York office and two years later was promoted to superintending engineer. He was named marine operating manager last year, the position he held until his latest promotion.

Capt. L. C. McKay, who has been marine superintendent for the company, has been promoted to the position vacated by Dr. Drew as marine operating manager, and Donald M. Brewer, formerly port engineer, becomes a superintending engineer.

EDWIN E. DOWELL has been named public relations manager for Vacuum Oil Co. of South Africa (Pty). Ltd., Capetown. Vacuum is a subsidiary of Standard-Vacuum Oil Co. in New York.

Mr. Dowell was international editions manager for *Newsweek* and was employed by the *New York Herald Tribune* in Europe and New York prior to entering the petroleum industry with Standard Oil Co. (N.J.). Besides handling public relations activities for Vacuum, he will act as public relations liaison for other Stanvac interests in the Union.

C. T. Thomas

CHEMICAL PROCESS NEWS

PUBLISHED BY CHEMICAL PROCESS DIVISION, THE M. W. KELLOGG COMPANY DECEMBER 1954

NOTES ON AMMONIA

One of the latest developments in the ammonia field is Kellogg's radical reduction in investment expenditures required to build a plant. As evidence of this, the company was recently awarded a contract for a 300 tons-per-day plant in the Midwest at the unusually low investment cost of about $50 per ton of annual capacity. Comparable plants have run upwards of twice this figure.

* * *

One source of this big saving lies in the fact that previous experience with Kellogg's high-pressure gas reforming step has resulted in refinements which increase its already high efficiency and more than proportionately decrease its cost. Furthermore, the process will employ only one synthesis section. In addition, operating experience with Kellogg ammonia converters has shown that they can be substantially reduced in size as can the heat exchangers without sacrifice of capacity.

* * *

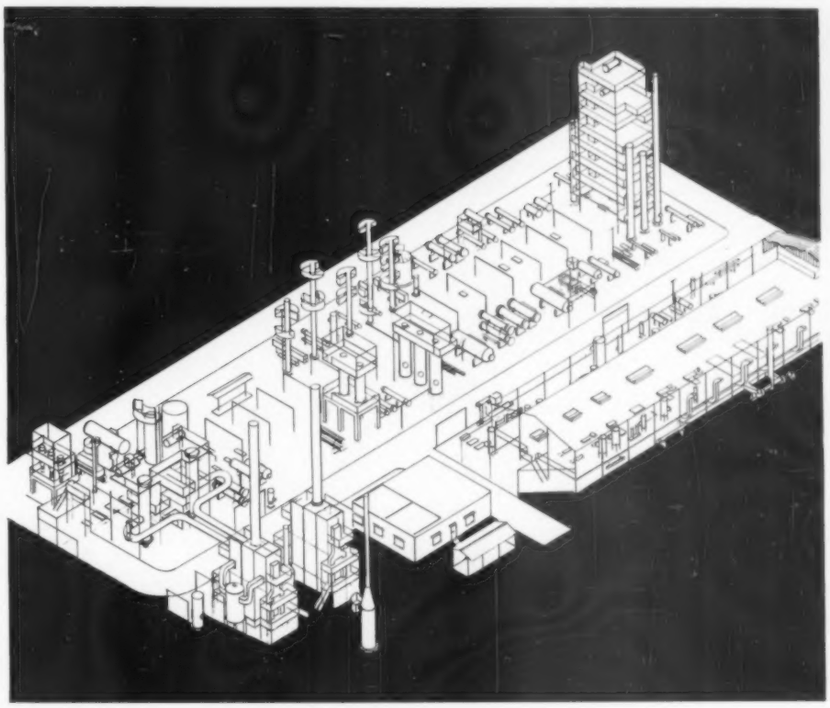
These developments come on top of a considerable amount of ammonia manufacturing know-how which Kellogg has been acquiring since the early 1940's. For example, another of the company's contributions to ammonia synthesis is a reactor which closely approaches the ideal.

* * *

For a reaction rate high enough to produce profitable yields, a special temperature gradient must be maintained in the reactor. This requires extremely close control of temperatures throughout the catalyst beds—a job made more difficult by the fact that the exothermic reaction occurs at a temperature near that at which catalyst activity begins to deteriorate rapidly and construction materials are threatened by accelerated corrosive attack.

* * *

Kellogg solved this problem with a reactor which employs layers of catalyst with provision for injecting quench between the beds. The result is a converter that effectively controls removal of the heat from the reaction zone, giving virtually point-by-point temperature control throughout.



Second Ethylene Plant to Use the Kellogg Pyrolysis Process is Now Going On Stream in Europe

Marking the second large scale commercial installation so far to employ Kellogg's exclusive steam pyrolysis process, a new ethylene plant is now going on stream near Milan, Italy. The plant is a part of a giant refinery modernization project Kellogg has undertaken for a well known chemicals producer. It includes a feed preparation section in which the heavy naphtha and gas oil feed stock is distilled from crude oil, a steam pyrolysis section in which the feed is cracked at high temperatures, and a recovery section which separates ethylene and other olefin products.

In addition to this plant, Kellogg is currently engaged in building another ethylene plant in England, the second such installation for the same producer. This plant, like its predecessor which Kellogg built three years ago, will utilize heavy naphtha for the primary production of ethylene which in turn will go into the manufacture of polyethylene.

Completion of the Italian plant, together with the other one underway, is indicative of a trend abroad which is expected to have more and more significance in the U. S.

Ethylene markets on both sides of the Atlantic have skyrocketed in the last few years. Forecasts are for even bigger demands in the not too distant future. In supplying these demands to date, U. S. producers have for the most part concentrated on cracking gaseous feeds—principally ethane and propane recovered from natural and refinery gases.

European producers, however, motivated by a lack of sufficiently large quantities of "crack-able" gases, have found it profitable to manufacture ethylene from heavier petroleum fractions. Important as a key to this movement—which was spearheaded three years ago by the British producer who built the first plant—has been Kellogg's steam pyrolysis design, developed specifically for such feed stocks.

The significance of this development to the domestic picture stems from several facts: First, the success of Kellogg's pyrolysis process has been proved in lengthy commercial operation to have superior advantages in high yields without excess coking. Second, the same principle can be adapted to the use of such feedstocks as casinghead or natural gasoline, re-

(continued on reverse side)

ETHYLENE PROPYLENE BUTYLENE

METHANOL ETHANOL PROPANOL

BUTANOL ISO-OCTYL ALCOHOL

BENZENE XYLENE TOLUENE

PHENOL FROM CUMENE

AMMONIA UREA

GLYCERIDES

(continued from previous page)

siduals, and other low value products which tend to be in over supply in the U. S. And third, the principle is also adaptable to conventional feeds, where pilot plant studies have shown the process to have the same advantages in high yields and low coking that it has shown with heavier feeds.

Consequently, for domestic producers, this means the availability of a new, proved ethylene process which greatly enlarges the field of raw materials that can be processed economically. It offsets any dependence on the present price structure of natural gas, and it can also offset dependence on refinery product raw materials, for economic studies based on Kellogg pilot plant data indicate that crude oil, itself, can be profitably processed to yield a maximum of olefins.

High Conversion, High Purity Mark Steam Pyrolysis Process For Ethylene

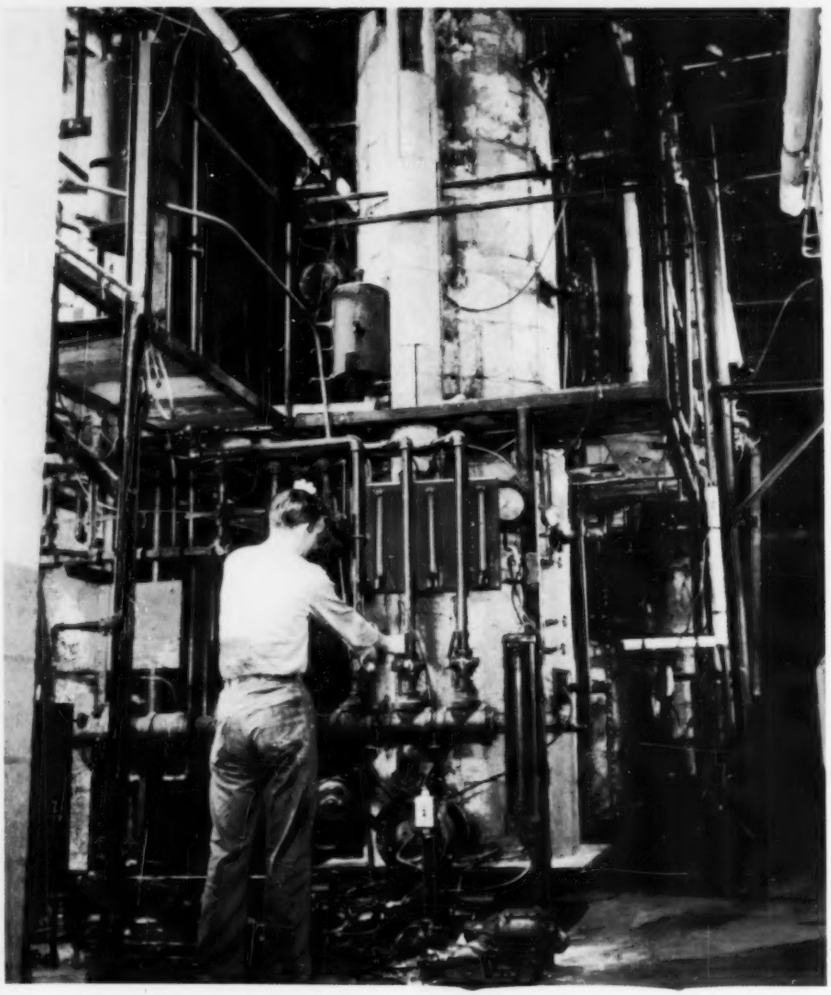
Kellogg's process for cracking petroleum feedstocks to produce ethylene employs a unique concept in the tailoring of petrochemical intermediates. This concept involves the use of superheated steam to: (1) supply heat for vaporization of the charge (in the case of a liquid feed); (2) reduce the partial pressure of the charge in the flash drum to a point that allows vaporization at a relatively low temperature, thus minimizing cracking in this step; and (3) to reduce the partial pressure of the charge in the high temperature pyrolysis step, thus insuring a higher rate of cracking of the feed and increased yield of olefins.

Results obtained with this process—both commercially and in exhaustive pilot plant studies—have been characterized by excellent yields of high purity olefins. In most instances, yields have exceeded any so far achieved using conventional cracking methods.

At the same time, it has shown a remarkable ability to suppress formation of coke in the furnace—one of the inherent disadvantages of conventional ethane and propane pyrolysis systems. Furnace coking in Kellogg's process has at no time been significant. Indications are that commercial plants using any of the possible feeds for olefin production could be operated continuously at high conversions without the need for spare cracking furnaces.

Economy of operation is attained by quenching after pyrolysis in waste heat boilers. When using the steam cracking process, full heat recovery at this point is achieved with only infrequent bypassing for cleaning of quench boilers. During normal operation, the boilers provide all the process steam required for the pyrolysis step.

Ethylene Pilot Plant Studies Continue



This is a view of the pilot plant in Kellogg's Jersey City laboratories where continuing studies are being carried out using various adaptations of the steam pyrolysis process to make ethylene from ethane, propane, and other feed stocks. Petroleum residuals and low value liquid fractions have also been studied extensively, and indications are that production of ethylene from crude oil itself would be an economically feasible operation.

For further information, technical data, etc., relating to chemical or petrochemical processing, write

CHEMICAL PROCESS DIVISION

THE M. W. KELLOGG COMPANY

225 Broadway, New York 7, N. Y.

In Canada

The Canadian Kellogg Company, Limited

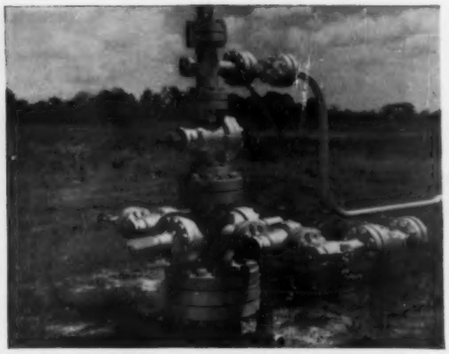
In Europe

Kellogg International Corporation

KELLOGG PULLMAN

Typical Current Kellogg Chemical Plant Contracts in the fields of—

- ★ Ethylene
- ★ Polyethylene
- ★ Phenol-from-Cumene
- ★ Anhydrous Ammonia
- ★ Methanol
- ★ Phthalic Anhydride
- ★ Liquid Fuel and Chemicals Synthesis from Coal
- ★ Glyceride Purification
- ★ Nitric Acid
- ★ Ammonium Nitrate
- ★ Ammonium Sulfate



CHRISTMAS TREES

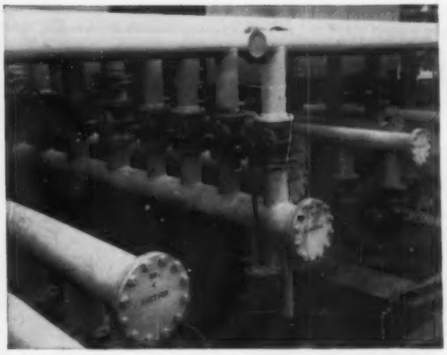
GASOLINE

MANIFOLDS

REFINERY

GAS TRANSMISSION

PETROCHEMICAL



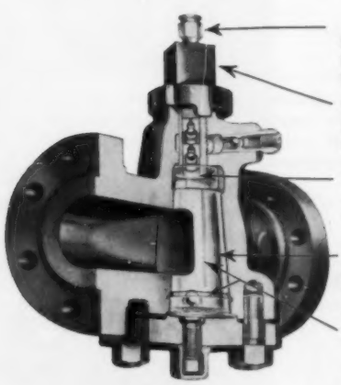
From Christmas Trees to Petrochemicals

EVERYWHERE ALONG THE LINE YOU'LL SEE

AUDCO-Nordstrom Valves

In every phase of petroleum production, refining and petrochemical operations, engineers have learned they can depend upon Audco-Nordstrom valves. You'll discover, too, that Audco-Nordstrom *pressurized lubrication* makes possible three important advantages you'll never find in ordinary valves: 1) the thin film of pressurized lubricant forms a positive seal between the valve plug and the body . . . it holds even the lightest hydrocarbons; 2) lubrication of all metal-to-metal working surfaces eliminates friction and reduces maintenance, cuts costs; 3) by turning the lubricant screw, the valve is automatically lubricated and provides jacking means if necessary.

Regardless of what your operations are, Audco-Nordstrom valves will give you better service with longer valve life at lower maintenance cost than any other valve you've ever used. There's an Audco-Nordstrom representative near you; get in touch with him or contact the offices listed below.


ROCKWELL FITTING
For Gun or Stick Lubrication
WRENCH SQUARE
One-Quarter Turn to Open or Close Valve
LUBRICANT CHAMBER
Provides Means for Jacking Plug if Necessary
TAPERED PLUG
Maximum Strength . . .
Perfect Seating . . .
Seat Never Exposed
LUBRICANT GROOVES
A Perfect Seal . . .
Cut-Offs Prevent Leakage into Line

AUDCO and Nordstrom

BRITISH

AUDLEY ENGINEERING COMPANY, LTD.
Newport, Shropshire
England

OVERSEAS AGENTS located in South Africa, Australia, India, Trinidad, British West Africa, Finland, Norway, Sweden, France, Belgium, Switzerland, Italy, Spain and Portugal

AMERICAN

ROCKWELL MANUFACTURING COMPANY
400 N. Lexington Ave.
Pittsburgh 8, Pa.

EXPORT: International Division
Rockwell Manufacturing Co.
7701 Empire State Bldg., New York 1, N.Y.

CANADIAN VALVE LICENSEE: Peacock Brothers Limited, Montreal, Que.

ROCKWELL

S. R. McMURRY, who has been on special assignment in the Bartlesville office of Cities Service Oil Co., has returned to Ponca City, Okla., as manager of the Cities Service refinery there. D. R. McConnohie, who was plant manager during Mr. McMurry's assignment in Bartlesville, is being transferred to the company's East Chicago, Ind., refinery on special assignment. C. W. Rohler is newly-appointed chief process engineer at the Ponca City refinery.

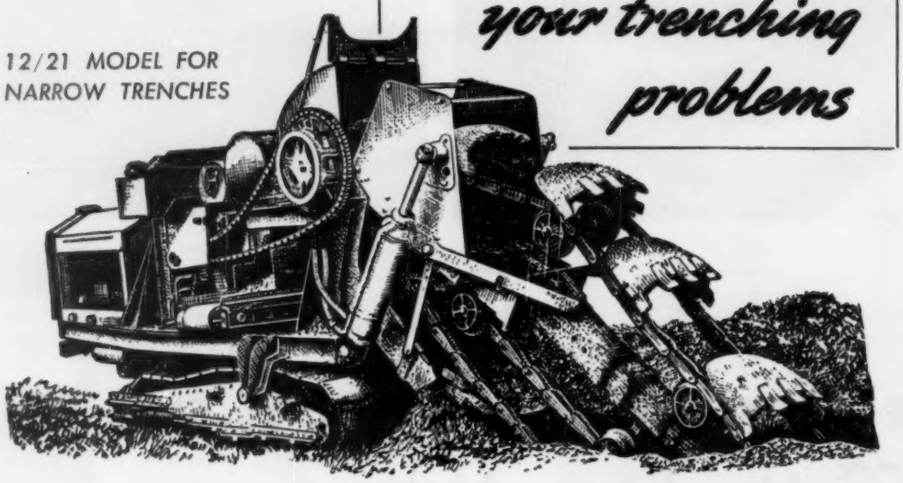
S. Z. NATCHER, formerly assistant to the vice president-conservation of Standard Oil Co. of California, has been named resident executive in London, where he will be principally concerned with Standard's interest in Iran. Mr. Natcher previously was headquartered in Los Angeles.

R. E. HEITHECKER, formerly with Seaboard Oil Co., has opened a consulting office at 6103 Martel Avenue, Dallas. He will work as a consulting engineer in the fields of petroleum and natural gas. Since 1945 he has worked with Seaboard in natural gas and reservoir engineering. During World War II he was in charge of the Bureau of Mines' special wartime studies of oil and gas condensate fields.

RICHARD N. MEINERT, associate chief of research at The Carter Oil Co., has been appointed associate coordinator of production research in the producing department of Standard Oil Co. (N.J.). Dr. Meinert joined Standard Oil Development Co. as a chemist in 1936 after serving six years as an instructor at Brown University. In 1947 he became assistant chief of research at Carter.

The answer to all your trenching problems

12/21 MODEL FOR NARROW TRENCHES

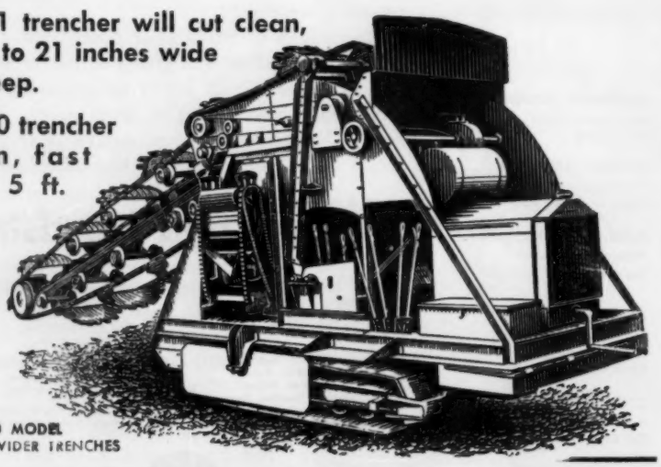


ALLEN *Super Duty* TRENCHERS

World-renowned, all-British ALLEN plant is recognised as the finest obtainable. For hard work, long life, freedom from breakdown and economical maintenance, it has no equal anywhere.

The Model 12-21 trencher will cut clean, fast trenches 13 to 21 inches wide down to 6 ft. deep.

The Model 16/60 trencher will cut clean, fast trenches up to 5 ft. wide down to 14 ft. deep.



Illustrated catalogues sent on request.

16/60 MODEL FOR WIDER TRENCHES

JOHN ALLEN & SONS (OXFORD) LTD. COWLEY OXFORD ENGLAND

H. R. Straight

HERBERT R. STRAIGHT, former president of Cities Service Oil Co. (Del.), was honored by company officers at a dinner on his 80th birthday at Bartlesville, Okla., September 30. A parchment scroll was presented by S. B. Irelan, his successor as president. Burl S. Watson, president of the parent Cities Service Co., came from New York to attend the dinner.

Mr. Straight was born at Tidioute, Pa. His father was an oil producer and Herbert became a roustabout at 16. He went to Oklahoma in 1911 for the T. N. Barnsdall interests and became a vice president of Cities Service in 1920. He was a pioneer in the application of engineering techniques to oil field problems and the wide-area approach to geological survey work.

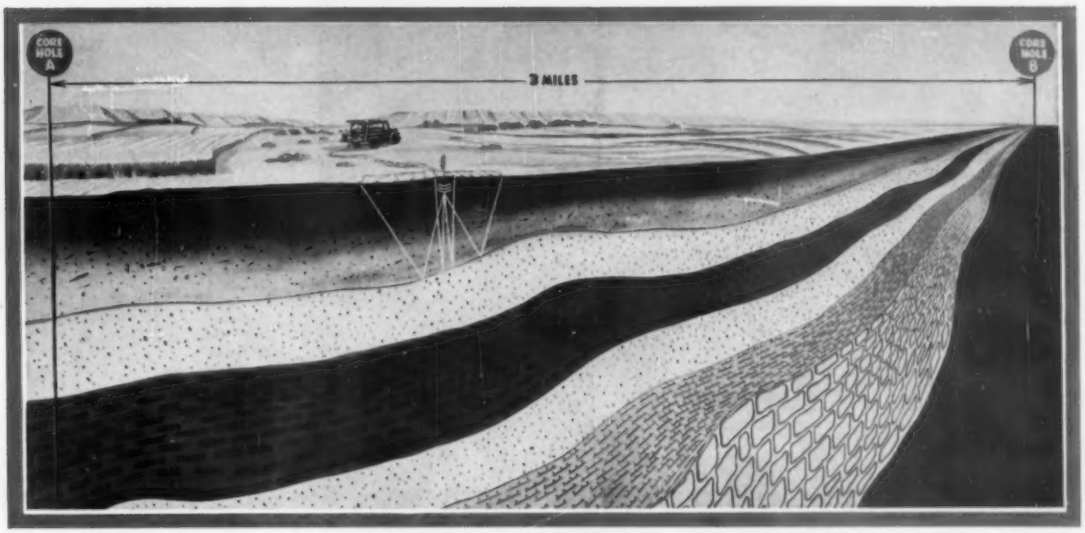
W. L. KYGAR, Ponca City, president of Continental Pipe Line Co., has been elected president of the recently organized Cherokee Pipe Line Co. Continental and Cities Service Co. each own a 50 percent interest in Cherokee, which was organized last July to purchase a 1,060-mile crude oil pipe line gathering and trunk system in Oklahoma and two crude oil lines extending 395 miles from Glenn Pool, Okla., to Wood River, Ill. Cherokee assumed ownership of the new lines September 1.

Other Cherokee officers are: John L. Kelly, vice president and general manager, products pipe line division; Ben D. Luety, Bartlesville, vice president and general manager, crude oil pipe line division; G. R. Preston, vice president and treasurer; and F. B. Plank, secretary.

P. H. DU VAL has been elected vice-president of Arkansas Fuel Oil Corporation. Since 1943 he has been vice president and general manager of the Arkansas Pipeline Corporation and manager of crude oil and gas purchases and sales of Arkansas Fuel Oil Corporation. He will continue to serve in these capacities.

P. H. Du Val

IS SHALLOW SEISMIC
INFORMATION IMPORTANT TO YOU?



REDUCE CORE HOLE COSTS with a GSI HR-equipped field party

Core hole intervals can be materially increased when a GSI HR program between holes provides correlation data and effectively reduces costs of near-surface information. HR (high resolution) surveys are a new GSI service which makes available a new range of seismic information in the 100 ft. to 2500 ft. section. When you have an extensive core hole program outlined, let GSI show you how HR work will extend your drilling budget. HR equipment *plus* GSI qualified personnel give you more useful data.

write for Bulletin No. S-303 describing the HR System used by GSI.

GSI HR services also furnish reliable reflection and refraction seismic data in problems of mining, ground water location, and civil engineering where shallow seismic information is important.

Other applications of this new service for shallow seismic data:

- ★ To establish near-surface velocity control
- ★ To furnish near-surface structural information
- ★ To determine base of weathering
- ★ To determine thickness of gravels, glacial drift, and other unconsolidated materials

GEOPHYSICAL SERVICE INC.
5900 LEMMON AVENUE · DALLAS 9, TEXAS

GSI *throughout the world*

The oil rig is going to sea—and the versatile Bell helicopter is going with it. The search for oil has extended to the bottom of the ocean and drilling rigs are springing up miles from shore.

Quick, safe, dependable transportation for men, supplies and equipment to these floating operations posed a major problem to oil and drilling companies.

The probem was easily solved. Bell helicopters, *equipped with floats,* are providing the answer for many operators. Heavy equipment is moved via boat and barge but key personnel, supplies and vital repair parts are speeded to off-shore rigs in reliable Bell helicopters.

Low operation and maintenance cost, plus more than a million flight hours, makes the Bell helicopter the best vehicle for off-shore work, where lost minutes mean thousands of lost dollars.

Bell helicopters enjoy a record of economically sound performance in the petroleum industry—*on shore and off shore.* We'd like to show you how this experience can benefit your company. For complete details—including the names of helicopter operators in your area—wire or write:

BELL Aircraft CORP.

DEPT. OS27, P.O. BOX 482, FORT WORTH 1, TEXAS

Sales and service representatives in 60 countries

Oil Company Earnings

Net profit of 36 oil companies in the first nine months of 1954 totaled $1,589 million compared with $1,569 million in the same period last year. Third quarter reports were somewhat less satisfactory than the results obtained in the first half. Oil companies with extensive foreign operations have shown better results than strictly domestic companies. This is attributed to the lack of increase in domestic demand in the United States, whereas increase in earnings abroad is seen in the case of Imperial Oil Ltd., which reported a profit of $41 million this year compared with $35 million in 1953.

Details by companies follow:

NINE MONTHS NET INCOME

	Thousands of Dollars		Per Share of Common	
	1954	1953	1954	1953
Amerada	$11,657	12,962	$3.70	$4.11
Atlantic	26,372	33,011	2.84	3.58
Barber Oil	711	3,552	.94	4.70
Bishop Oil	160	178	.43	.48
Continental	31,337	31,163	2.72	2.08
Gulf Oil	116,359	116,828	4.74	4.76
Honolulu Oil	8,129	7,712	4.33	4.11
Houston Oil	4,308	5,002	3.23	3.77
Imperial Oil Ltd.	41,235	35,323	1.38	1.18
Lion Oil Co.	7,588	7,450	2.54	2.41
Mid Continent	9,795	10,626	5.25	5.72
Middle States	1,662	1,901	.72	.82
Ohio Oil	28,281	33,025	4.31	5.03
Panhandle	658	664	.41	.42
Phillips	55,615	55,458	3.80	3.80
Pure Oil	20,829	18,518	4.71	4.14
Plymouth	4,930	6,744	2.05	2.81
Pacific Western	5,276	8,969	.93	1.64
Quaker State	1,480	1,534	1.79	1.66
Richfield	18,278	19,359	4.57	4.84
Shell Oil	89,545	81,481	3.26	2.97
Seaboard	5,346	5,214	1.46	1.43
Sinclair	52,986	47,506	4.29	3.87
Skelly	20,933	22,600	3.64	3.93
Socony-Vacuum	128,000	133,000	3.65	3.80
Standard of Calif.	154,921	140,217	5.25	4.66
Standard of Ind.	81,444	88,634	5.24	5.76
Standard of Ky.	9,544	7,764	3.66	2.98
Standard of N.J.	438,000	432,000	7.23	7.13
Standard of Ohio	12,385	14,198	2.93	3.38
Sunray	15,900	18,900	1.51	1.84
The Texas Co.	151,880	133,353	5.83	4.85
Texas Gulf Prod.	3,813	2,912	3.12	2.63
Union Oil of Calif.	27,151	28,007	3.98	4.11
Venezuela Pet.	2,407	2,799	.60	.70
Wilcox Oil	437	708	1.56	2.52
	$1,589,262	$1,569,272		

Cracking Unit for Champlin Refinery

Earl Baldridge, of Fort Worth, Texas, president of the Chicago Corporation and of its subsidiary, Champlin Refining Co., has announced the placing of a contract with the M. W. Kellogg Co. for construction of a 9,000 b/d Model B Orthoflow fluid cracking unit at the company's Enid, Okla., refinery as part of a $4,000,000 improvement program to be carried out at the plant.

Another new installation will be a UOP platformer of 5,000 b/d capacity to be constructed by Southwestern Engineering Company for completion early in 1955.

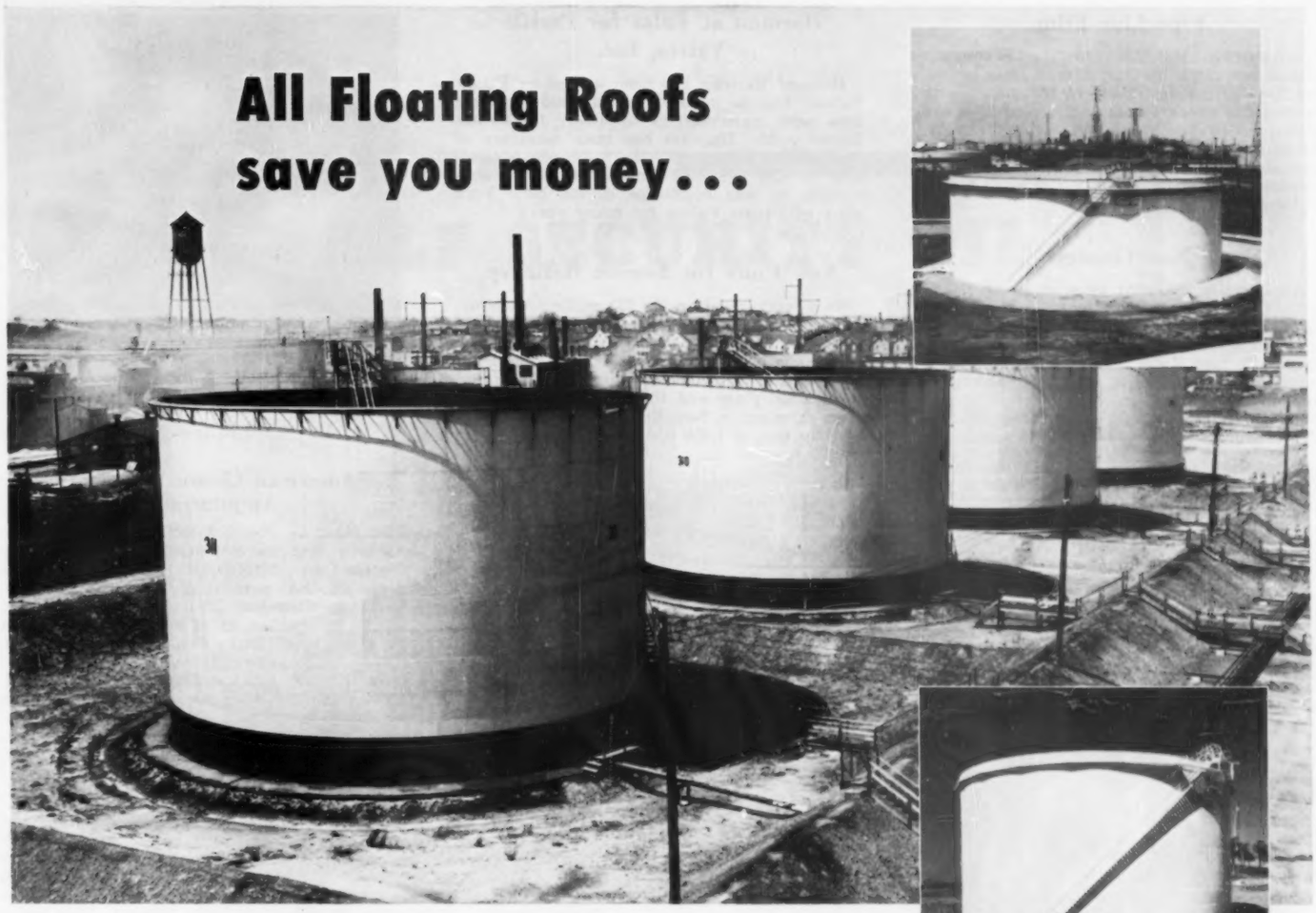
Badger Mfg. to Make Uniflux Trays

Badger Manufacturing Co. of Cambridge, Mass. has been licensed to manufacture and sell the Uniflux tray, a new type of bubble tray developed by Socony-Vacuum Oil Company.

Advantages claimed for the tray are its light construction and the ease with which sections can be removed or inserted. The design has been in use for some time on the cracking facilities of one of Socony's refineries in France.

New Drawworks

A new Brewster 1,200 hp drawworks has been developed for 14,000-foot drilling that can be moved as a single package. Controls, transmission, rotary drive and hydromatic brake are all mounted on the main skid. Transmission has eight forward and one reverse speed to the rotary. Pump speed can be maintained at maximum without increasing rotary speeds.



FIND OUT HOW A

Wiggins Floating Roof

CAN SAVE MORE MONEY FOR YOU
CAN GIVE YOU BETTER OPERATION

Important savings—and all savings that help to improve profits are important—can only come about by doing a specific job better. The performance of the Wiggins Floating Roof has been analyzed and compared with all other types throughout the world in every range of temperature and climate.

It is a proven fact that the Wiggins Triple Seal is a major factor enabling Wiggins Roofs to save more of the volatile vapors—meaning profit—than can any other type. Thus a Wiggins installation "pays out" more quickly.

That's not all; the Wiggins designs take into account those matters of conservation, safety and maintenance so thoroughly that when you have a Wiggins Floating Roof you have one that sets a new, high standard of performance—and in investment, too.

Maybe not today, or tomorrow . . . but *soon* you may decide to modernize by the installation of the finest money-saving equipment available.

However, *now* is the time to write for important technical data comparing Wiggins Floating Roof, feature for feature, result for result, with all other roofs. We can prove that Wiggins Floating Roofs do the best job, the most profitable job, under all conditions.

EXPORT DIVISION
GENERAL AMERICAN
TRADE MARK

LICENSEES

Etablts. Delattre & Frouard Reunis
39, Rue de la Bienfaisance Paris, France

•

Breda Elettromeccanica e Locomotive, S. P. A.
Sesto San Giovanni
Milan, Italy

•

Ashmore, Benson, Pease & Co.
Stockton-on-Tees, England

•

A. E. Goodwin Ltd.
47 Forsyth Street, Glebe, Sydney, Australia

•

Sanson Vasconcellos
Comercio e Industria de Ferro S.A.
Rua Frei Caneca, 47/49
Rio de Janeiro, Brazil

•

Tsukishima Kikai Company, Ltd.
9, 5-chome, Tsukishima-dori, Chuo-Ku
Tokyo, Japan

•

Toronto Iron Works Ltd.
629 Eastern Avenue
Toronto, Ontario, Canada

•

Taiwan Shipbuilding Corporation
P.O. Box 19, Keelung, Taiwan (Formosa)

GENERAL AMERICAN TRANSPORTATION CORPORATION

Export Division: 380 Madison Avenue, New York 17, New York

Pipe Line Film

A narrative color film recording the construction of two crude oil transmission lines beneath the four-mile-wide Straits of Mackinac — the longest and deepest underwater pipe lines ever attempted by "pull" method — has been produced by Merritt-Chapman & Scott and is now available for use upon request. Prints are obtainable by writing Merritt-Chapman & Scott at New York or Cleveland.

New Cleaner

An entirely different type of glass cleaner with three active ingredients has been developed by Gulf Oil Corp. to eliminate the smearing and scumming-up of automobile windshields. Named Klear-Shield, it has been introduced for service use in stations handling the company's line to dissolve the water-insoluble materials not removed in ordinary washing of windshields.

Harmon at Tulsa for Pacific Valves, Inc.

Howard Harmon has been named by Pacific Valves, Inc. as manager of the mid-continent area with headquarters in Tulsa, Oklahoma. Recently Mr. Harmon has been secretary of the California chapter of the American Association of Oil Well Drilling Contractors. Previously he was in charge of the New York office of Pacific Valves for many years.

New Units for Everett Refinery

As a further step in the $23 million modernization program of Esso Standard Oil Company for its refinery at Everett, Mass., three new units have been put in operation. These are a 13,500 b/d asphalt vacuum pipe still, a Girbotol purification plant and the first liquified petroleum gas plant in New England. The latter has a production of 1,000 b/d.

Dr. A. G. Oblad

American Chemical Society Appointment

Dr. Alex G. Oblad, associate manager of the research and development division, Houdry Process Corp., Marcus Hook, Pa., is chairman-elect of the petroleum chemical division, American Chemical Society. He will succeed Dr. E. C. Hughes, chief of the chemical and physical research division, Standard Oil Co. (Ohio), whose term expires September 1955.

Dr. Hughes has appointed Dr. Robert K. Smith, chief of Houdry's exploratory research section, to succeed Dr. Oblad as managing editor of publications for the petroleum division, which has 2,700 members—ACS's largest body.

Orders New Supertanker

Sinclair Refining Co. has ordered Bethlehem-Sparrows Point Shipyard, Inc. to build a 25,200-deadweight ton, high speed tankship. The new vessel will be similar in most respects to the design developed jointly by Sinclair and Bethlehem for Sinclair's latest tankers. Each has a deadweight of 25,200 tons, an overall length of 605 feet, beam of 78 feet, depth of 44 feet and cargo tank capacity of 212,400 barrels, and cost about $7 million. The new tanker will be somewhat speedier. Shaft horsepower will be 15,000, as compared to 13,750 for her predecessors. The two existing ships have a service speed of between 17 and 18 knots.

Heads Hammond Eastern Sales

Ralph E. Kramer, vice president in charge of sales for Hammond Iron Works, announces the appointment of Earl H. Bodinson as eastern division sales manager with headquarters at New York. Mr. Bodinson is well-known throughout eastern oil and chemical industries, having spent 16 years in that area, the last eight years with the Hammond Iron Works. Recently he has been district sales manager at Bristol, Pa.

E. H. Bodinson

Speeding the flow

When the flow of oil must wait for the erection of new plant, the degree of skill and resource brought to the work of construction is a major economic factor. For this skill there is no firm grounding other than wide, first-hand, practical experience of process engineering for petroleum and petrochemicals, of the kind possessed by D. & C. and William Press Ltd.

D & C AND WM. PRESS LTD.

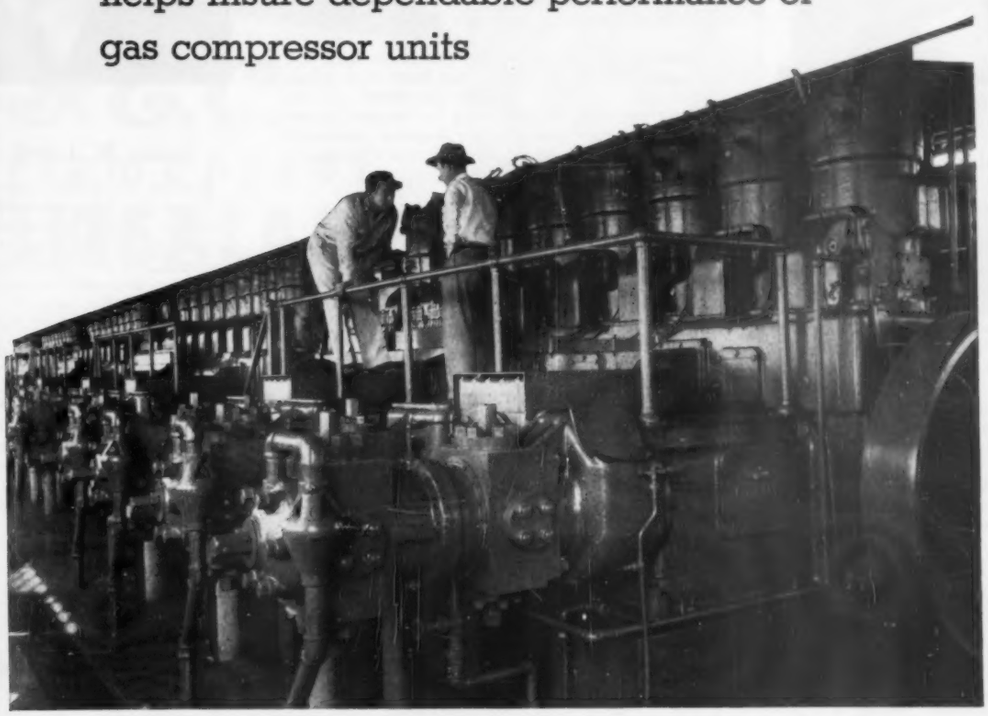
civil, mechanical and chemical construction engineers at home and abroad

Head Office: 27 ASHLEY PLACE, LONDON, S.W.1. Tel: VICtoria 9751 (6 lines) 'Grams: Demcopress, London

TA6605

GULF SECURITY OIL

helps insure dependable performance of gas compressor units



Smooth, continuous operation is a must for these units in service at a South Texas gas compressor plant. They are responsible for the steady flow of essential natural gas through pipe lines to homes and industries as far north as Detroit and New York. Gulf Security Oil provides the sure, effective protection needed for cylinders and bearings in both engines and compressors.

You can depend on Gulf Security Oil to provide the proper lubrication that is so important to vital compressor units if operating troubles are to be prevented and maintenance costs kept low.

Gulf Security Oil has a record of outstanding performance in scores of gas transmission plants. After years of operation with this quality oil, the cylinders and piston rings of both the compressors and power assemblies show negligible wear. And few carbon deposits have formed on power cylinder ports and pistons.

If you are installing new compressor units, or feel that you're not getting the most effective lubrication possible for your present units, it will certainly pay you to try Gulf Security Oil. Contact your nearest Gulf Office and have a Gulf Sales Engineer call.

Gulf Oil Corporation • Gulf Refining Company

1822 GULF BUILDING, PITTSBURGH 30, PENNSYLVANIA

GULF INDUSTRIAL LUBRICATION

H. D. Hartough

Houdry Appoints Hartough

Howard D. Hartough has been appointed to research on new petrochemicals and catalysts at the Marcus Hook, Pa. laboratories of the Houdry Process Corp. Mr. Hartough holds 70 patents and has authored 30 publications, two-thirds of them on thiophene. He has written the only books in English on this chemical. "*Thiophene and Derivatives*" was published in 1952. "*Compounds with Condensed Thiophene Rings*," co-authored with S. L. Meisel, was brought out this year.

For 13 years, the research chemist worked on petrochemicals and the development of thiophene at the Socony-Vacuum Laboratories, Paulsboro, N.J. He left there to join the Hercules Power Co. three and a half years ago, in Wilmington, Del., where he was engaged in market development for petrochemicals until joining Houdry.

Drilling & Exploration Personnel Changes

C. A. Wiggins, president of Drilling and Exploration Company, Inc., has announced the following company changes:

John H. (Jack) Lewis has resigned as vice president in charge of the foreign department. Mr. Lewis, an authority on foreign operations, had been with the company about 12 years, during which time he operated in most of the oil producing countries of the world.

The foreign department of the company is being combined with its domestic contract drilling department and will be operated by Robert L. (Bob) Rose. Mr. Rose has been with Drilling and Exploration for eleven years and has been vice president of the drilling subsidiary under which all domestic contract drilling has been done.

Wallace W. March, who has been with the company for 20 years and has been vice president and assistant to the president of the parent company specializing in foreign operations, is being moved to Los Angeles, where he becomes vice president and secretary-treasurer of the subsidiary.

Aviation Products Line

Plans for an 83-mile gasoline and aviation jet fuel pipe line from Ponca City refineries of Continental Oil Co. and Cities Service Co. to the government's Wichita, Kans., Air Force Base have been announced by Cherokee Pipe Line Co., recently formed by Continental and Cities Service.

Ohio Houdriformer on Stream

The Ohio Oil Co. has completed a new 8,330 b/d Houdriformer unit at its Robinson, Illinois refinery. The new unit was engineered and constructed by the Catalytic Construction Co. of Philadelphia. It is equipped with three catalytic reactors, a guard reactor, and a three-stage heater.

J. M. Carry

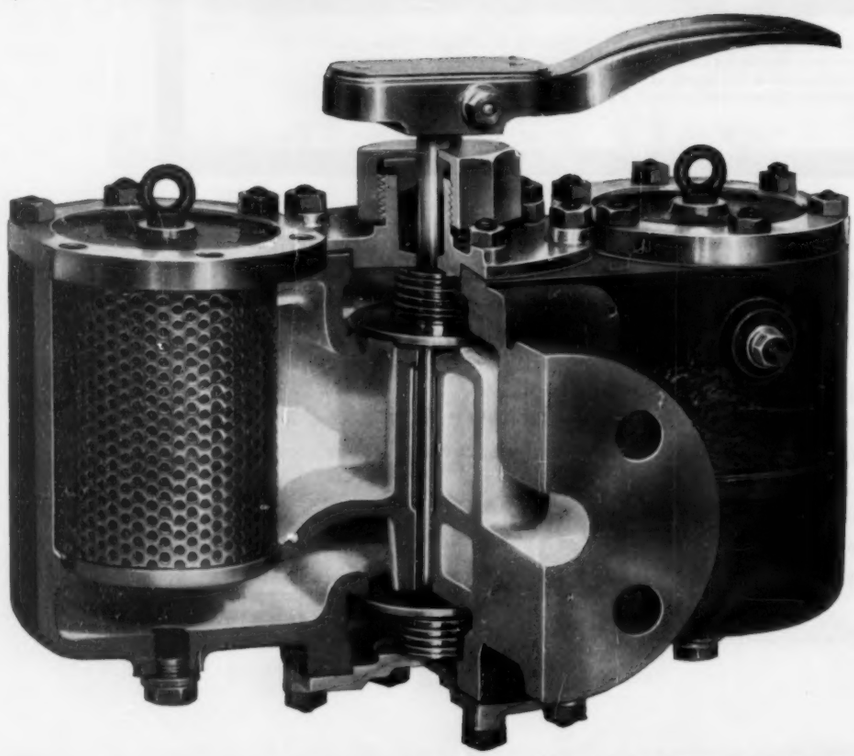
James M. Carry Joins Kellogg

Warren L. Smith, president of The M. W. Kellogg Co., has appointed James M. Carry as assistant to the president. For the past three years, Mr. Carry has been assistant to the president of Pullman, Inc., and previously he was vice president in charge of operations of The Pullman Co.

New Stainless Steel Plug Valves

A new line of lower-priced stainless steel Rockwell-Nordstrom lubricated plug valves especially recommended for use in plastic and chemical plants has been introduced by the meter and valve division of Rockwell Manufacturing Co., Pittsburgh. Featuring chrome-plated plugs, the new valves are suitable for most services in which the more expensive stellite-coated valves have previously been used.

ZWICKY N.Z. DUAL FILTER



Gives continuous flow of filtered liquid

The filter cages may be used in parallel or singly, and the change-over valves are specially designed to allow cleaning to be done without interrupting the flow of liquid.

Suitable for water, petrol and oils, and may be installed in a vertical or horizontal position to suit any pipe line arrangement.

Zwicky Ltd.

TRADING ESTATE, SLOUGH, BUCKS

Telephone: SLOUGH 24481/2/3

POWER AND HAND PUMPS, MICRON FILTERS, PATENT HOSE REELS, SPECIALISTS IN PUMPING AND FILTERING EQUIPMENT

WHERE EXPLOSION HAZARDS EXIST

THIS SAFETY DEVICE IS *Essential!*

VISIBLE WARNING

For use in oil refineries, power plants and similar installations. Conforms to B.S.S. 229 Group II and III

& SOUND

G.E.C.
Flameproof
"LITEALARM"

Designed to give visible and audible warning of conditions leading to possible breakdown, (motors overheating, excessive pressures, overspeed, dangerous level of tank fluids, etc.) Easy installation — simple operation. Full details of the "Litealarm" available on request.

THE GENERAL ELECTRIC CO. LTD., MAGNET HOUSE, KINGSWAY, LONDON, W.C.2

Equipping for comfort and full-time efficiency

Economically and far-sightedly the great Companies with installations throughout the world have equipped with Dunlopillo — the modern cushioning that means more comfort and better work where people are employed in trying climates. For office, transport and canteen seating, in seating and mattresses for staff quarters, Dunlopillo is a long-term investment. Its air-conditioned latex foam withstands constant use without loss of resilience, without sagging, or "breaking down", and it is unaffected by extreme temperatures or humidity throughout its long life of undiminished comfort.

with

DUNLOPILLO

and all its advantages— *not affected by temperature or humidity • moth, germ and vermin-resisting • cannot create dust or fluff • never needs airing • cannot sag or form lumps • never needs re-making • silent in use*

DUNLOP RUBBER CO. LTD., (DUNLOPILLO DIVISION), WALTON, LIVERPOOL, ENGLAND · ASSOCIATED COMPANIES AND DISTRIBUTORS THROUGHOUT THE WORLD
40/05

Centrifugal Pump Bulletin

A new bulletin, W-395-B2, on self-priming centrifugal pumps issued by Worthington Corp. explains graphically the specifications, applications and sizes of various types. Copies are obtainable from the advertising and sales promotion department, Worthington Corp., Harrison, N.J.

Internal Tube Cutter

A new internal tube cutter, lightweight in design and fast in operation, has been developed by The Airetool Mfg. Co. to remove damaged or leaky tubes from condensers and heat exchangers. Tool steel double cutters used are easily replaced when worn. The cutter is inserted in the tube and quickly cuts the tube behind the tube sheet. Airetool tube removal tools are then used to knock out and remove the remaining portion of the tube in the header.

Alkylation Unit On Stream

Cosden Petroleum Corp. recently put on stream a new 2,065 b/d UOP "HF" alkylation unit designed to produce grade 115/145 aviation gasoline for the armed services.

The installation uses as a charge stock propylene, amylenes and isobutane produced in a UOP fluid catalytic cracker and thermal cracker. It is one of the few units now in operation which charges a high percentage of amylenes.

Alkylate is blended with isopentane and toluene, the latter obtained from Cosden's integrated Platformer-Udex unit, to produce the high octane aviation gasoline.

The alkylation unit has two unusual design features. One is a horizontal contactor which replaces the vertical contactor type typical of wartime installations. The other is the use of surplus exhaust steam which serves to reduce the quantity of high pressure steam normally required. Universal Oil Products designed, engineered and licensed the unit.

D. P. Barrett

Heads Davison Sales

Appointment of David P. Barrett as sales manager of the industrial chemicals department, Davison Chemical Co. Division of W. R. Grace & Co., was announced by D. N. Hauseman, vice president. He succeeds N. E. Hathaway, resigned. He has been assistant sales manager of the industrial chemicals department since September 1952.

Texaco Alkylation Unit

The Texas Co. is building an olefin fractionation unit as feed preparation for its new alkylation unit now under construction at Westville, N.J. Both the alkylation unit itself and the feed fractionator are to be completed in December. Catalytic Construction Co. is contractor.

Joins Avondale Marine

Robert Lamar Woodfin has been appointed assistant manager of Avondale Marine Ways, New Orleans. He will offer service to oil and drilling companies. Mr. Woodfin has been engaged in oil equipment sales activities and in oil field work for more than 20 years.

Extending Products Line

The Buckeye Pipe Line Co. is laying a new 8-inch products line from Lima to Columbus Ohio, as an extension of Buckeye's existing midwest products system running from Lawrenceville and Robinson, Ill. to Toledo with intermediate terminals at Indianapolis, Muncie and Lima. Buckeye will also convert an existing 8-inch line formerly in crude service to products service between Toledo and Lima so that refined products transportation will be offered direct from Toledo to Columbus, a distance of 165 miles.

Surface Agent for Stored Oils

A chemical "blanket" for stored gasoline and oil, which would greatly reduce fire hazards, evaporation losses and air pollution, was described by G. B. Blake, A. H. Albrecht and H. G. Bryce of the Minnesota Mining and Manufacturing Co. at the 126th national meeting of the American Chemical Society at New York. Fluorocarbon surfactants which retard evaporation by forming an extremely thin, invisible film on the surface of petroleum products in storage were reported effective even when added in quantities as small as two-thousandths of 1 per cent of the gasoline weight.

The surfactants were proposed as wetting agents in insecticides, wax and lubricants. Almost twice the normal kill of houseflies was obtained when a small quantity of an appropriate fluorocarbon surfactant was added to the mixture. Lubricants and coating waxes also were improved, according to preliminary tests.

"TUBEND"

WELDING FITTINGS

The Tubend range of welding fittings meet the requirements of practically every type of prefabricated pipe assembly and the facility, economy and efficiency of fabrication becomes even more marked when working in confined spaces and effecting difficult directional changes.

The Tubend range comprises: elbows, return bends, reducers, tees and caps manufactured under strict supervision to meet the requirements of both British and American specifications.

DISTRIBUTORS IN CANADA:

VANCOUVER MACHINERY DEPOT LIMITED

Suite 1011, Royal Bank Building, 2, King Street East, TORONTO, Ontario

1155, West Sixth Avenue, VANCOUVER (9) B.C.

THE LUCEY CANADIAN SUPPLY CO. LIMITED
EDMONTON, ALBERTA, CANADA

Manufacturers B·K·L ALLOYS LTD·BIRMINGHAM 30·ENGLAND

BOOKS

PRACTICAL ACCOUNTING FOR OIL PRODUCERS—Robert William Pritcher	$ 9.70
ALKYLATION OF ALKANES—Gustav Egloff & George Hulla	$22.50
CORROSION HANDBOOK—Herbert H. Uhlig	$15.00
CHEMICAL BUSINESS HANDBOOK	$17.20
CHEMISTRY OF PETROLEUM DERIVATIVES—Carleton Ellis Vol. 11	$25.00
CONVERSION OF PETROLEUM—A. N. Sachanen	$12.00
CHEMICAL ENGINEERS' HANDBOOK—John H. Perry. (revised 3rd edition, 1950)	$17.00
CORROSION (Causes and Preventions)—Frank N. Speller	$11.00
THE CHEMICAL PROCESS INDUSTRIES—R. N. Shreve	$10.20
CHEMICAL ENGINEERING ECONOMICS—C. Tyler	$ 5.00
CHEMICAL ENGINEERING PLANT DESIGN—F. Vibrandt	$ 7.50
CHEMICAL TECHNOLOGY OF PETROLEUM—Cruse and Stevens	$10.20
DISRUPTED STRATA—M. H. Haddock	$ 6.20
ECONOMICS OF U.S. AND WORLD OIL	$ 5.70
ELEMENTS OF FRACTIONAL DISTILLATION—Robinson & Gilliland (4th Edition)	$ 8.70
ELECTRICAL ENGINEERING—E. E. Kemberley	$ 6.70
ELECTRICAL WELL LOGGING	$ 1.00
ELECTRICAL WELL LOGGING FUNDAMENTALS	$ 3.25
THE FISCHER TROPSCH AND RELATED SYNTHESES—H. H. Storch, N. Golumbic and R. B. Anderson	$12.20
ELEMENTS OF OIL RESERVOIR ENGINEERING—Sylvain J. Pirson	$ 7.70

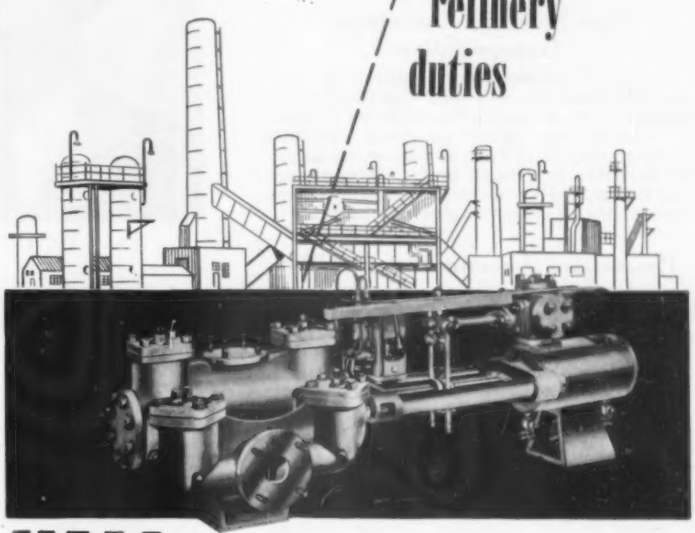
TO ORDER, WRITE TO:

BOOK DEPT. WORLD PETROLEUM

604 FIFTH AVE., NEW YORK 20, N.Y.

"Hall" Horizontal Duplex and Horizontal Simplex Type pumps are manufactured for practically every refinery service. They can be supplied with steam jackets, elongated water cooled stuffing boxes, special type valves and seats, and, if required, they can be fitted with proportioning pumps.

for oil refinery duties

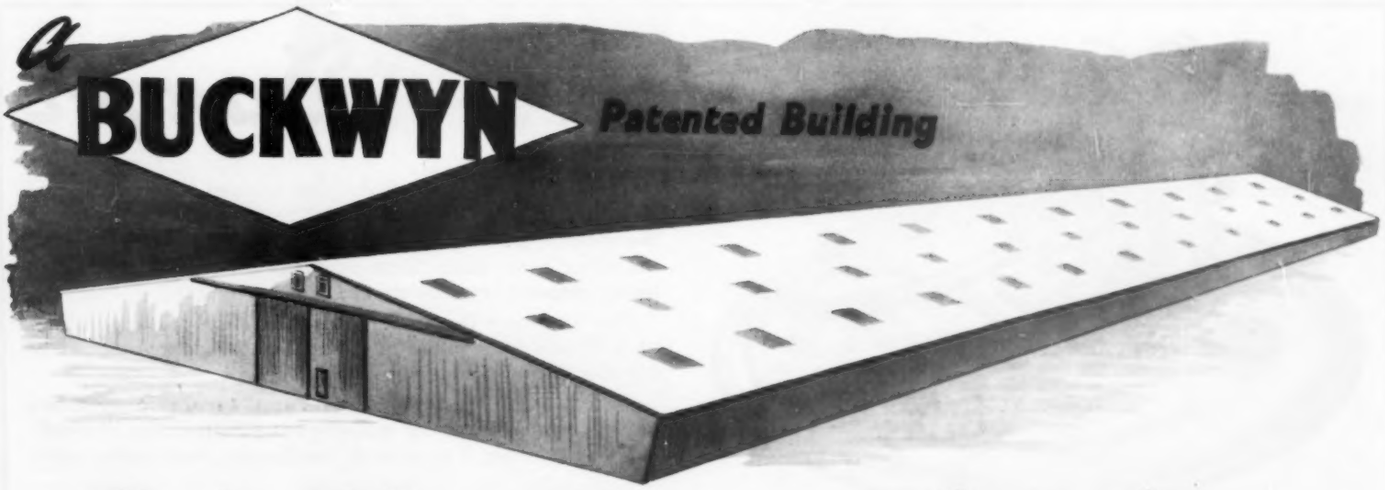


HALL REFINERY PUMPS

J. P. HALL & SONS LTD., PETERBOROUGH, ENGLAND

P3837

a **BUCKWYN** Patented Building



The World's most economical warehouse

(Areas 10,000 to 50,000 sq. ft.)

As adopted by **the Admiralty, the Ministry of Works, the Ministry of Supply and Foreign Governments.**

Frame construction in tubular steel and high tensile cable, Buckwyn metal tiled in aluminium or steel with or without **Insulation for all climatic conditions.**

Complete Buildings from 7/6 sq. ft. delivered on site or F.O.B. or 9/- sq. ft. erected.

Also Buckwyn Houses, Schools, Military Hutting, etc.

In the race for economy BUCKWYN wins!

BUCKWYN CONSTRUCTIONS LTD.

DEPT. 14 **TWYFORD, BERKS, ENGLAND** Tel.: Wargrave 310

Texas to Drill in Florida

In conjunction with St. Regis Paper Co. and Florida Oil & Gas Co., The Texas Co. has undertaken to do test drilling on a 10,000-acre area in western Florida. Drilling operations will be conducted by The Texas Co., which will bear 50 percent of the cost, the remainder being divided equally between the other two participants.

Pipe Lines for Petroleum Transportation

Bulletin PL-1 has been published by Minneapolis Honeywell Regulator Company, Philadelphia 44, Pa. to discuss the problems involved in transporting liquid petroleum products through pipe lines. First in a series, the bulletin describes in general terms a typical pipe line system, the variables to be measured, and some of the problems of pipe line control.

Promotions Announced by Skelly

The Skelly Oil Co., through William G. Skelly, president, and John S. Freeman, vice president in charge of production, has announced a rearrangement of personnel and supervision with five changes effective August 1.

C. L. Blacksher, who has been Panhandle district superintendent at Pampa, Tex., has been made area superintendent of field operations for the southern portion of the Skelly operating territory with headquarters in Tulsa.

W. P. Whitmore, formerly chief petroleum engineer at Tulsa, has been made area superintendent of field operations for the northern portion of the firm's operating territory with headquarters in Tulsa.

D. E. Smith, formerly petroleum engineer in Tulsa, has been made chief petroleum engineer.

V. E. Fletcher, formerly district foreman at Kermit, Tex., replaces Mr. Blacksher as Panhandle district superintendent with headquarters at Pampa.

Dr. R. C. Johnson

Joins Lummus Technical Staff

Dr. Raymond C. Johnson has been appointed as an associate on the technical staff of the Lummus Co., New York. He will have as his primary responsibility the development, coordination and supervision of all activities involving work in the company's laboratories. He was formerly vice president in charge of research for the Anthracite Institute.

Installs $110,000 Computer

An "electronic brain" of the most advanced category — technically known as a general purpose, stored-program digital computer — has been added to the facilities of Gulf Oil Corporation's laboratories at Harmarville, Pa. Valued at about $110,000, it is expected to greatly accelerate many phases of the company's research.

Tellepsen Appointment

Stafford H. Wilde has been appointed division sales manager of Tellepsen Petro-Chem Constructors, a division of Tellepsen Construction Co. of Houston. He formerly was vice president of Bellco Industrial Engineering Co., Houston.

From 1930 to 1945 Mr. Wilde was associated with the Henry J. Kaiser interests.

Supreme Court Refuses Tariff Reduction

In a decision rendered on October 18, the Supreme Court of the United States refused an appeal of the Metropolitan Petroleum Corp. protesting the increase of the tariff duty on imported fuel oil from one-quarter to one-half cent per gallon imposed by proclamation of President Truman in September 1950. The court held that the duty had been reduced by a trade agreement between the United States and Mexico in 1939 and that as a result of the termination of that agreement the duty automatically returned to its earlier figure.

GSI Conference

New geophysical instruments, their applications in oil exploration, and techniques of interpreting data obtained by them were described by Geophysical Service, Inc. in an annual supervisory conference held in Dallas September 3-4. Field management personnel attended the conference from offices throughout the United States, in Canada, in Mexico, and The Netherlands.

The geophysicists saw demonstrations of the operation of a new magnetic recording seismograph system and of a high resolution seismograph system which makes it possible to obtain geophysical data from very shallow geological formations. Both instruments are manufactured by Houston Technical Laboratories, a subsidiary of Texas Instruments Incorporated, and an associate company of GSI.

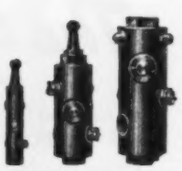
Descale WITHOUT Danger

The Air Motor "Skatoskalo" Set enables the operators to descale and clean tubes (from ⅝" internal dia. upwards) in the shortest possible time with the greatest efficiency. The air motor gives more horse-power and does not stall when heavy deposit is encountered.

The Air Motor Driven Set incorporates all the advantages of a Rotary Air Tool without sacrificing the advantages of the electrically-driven Flexible Drive type.

"Skatoskalo" equipment can be used with complete safety and is recommended for the efficient maintenance of cracking plant, boilers, evaporators, condensers, heat exchangers, etc.

The wide range of "Skatoskalo" wire brushes, grinding wheels, small tools and accessories enables the Set to be quickly and inexpensively equipped for general purpose work.



Skatoskalo pneumatic tools deliver 9,000 blows a minute. Other types for surface scaling.

The "SKATOSKALO" Single Speed Air-Driven Descaling Machine.

Flexible Drives (Gilmans) LTD.

INCORPORATING P. GILMAN (B.S.T.) LTD.

Representatives in all parts of the United Kingdom. Principal agents in over sixty countries throughout the world.

A Type T.E. tube scaling head "bites" into scale at 5 different levels as it progresses through a 2" tube.

SKATOSKALO

Write for Catalogue WP or contact our nearest Agent.

195 HIGH STREET, SMETHWICK 41, STAFFORDSHIRE, ENGLAND

Cables: Skatoskalo, Birmingham
Code: Bentleys

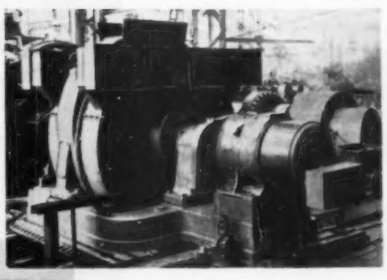
VOKES FILTERS

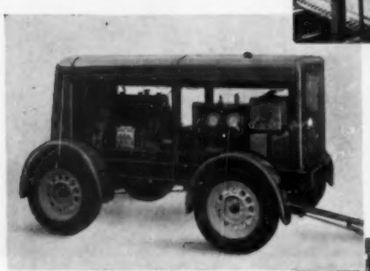
PLAY A VITAL PART IN KEEPING THE OIL FLOWING

In the blinding desert dust storms which sweep the area of the Iraq pipelines, VOKES filters have twice been chosen for the important task of protecting pumping stations and ancillary equipment . . . proof indeed of the important part which VOKES filtration is playing throughout the world in safeguarding plant and machinery from wear, breakdown and unnecessary depreciation.
Below are shown three typical aspects of VOKES protection . . . protection which cannot be jeopardized by the non-availability of element replacements because VOKES FILTERS ARE CLEANABLE.

MICRO-VEE PANEL FILTERS FOR ELECTRIC MOTORS

Electric motors breathe too . . . and these VOKES filters have proved conspicuously successful in preventing the grave damage hitherto sustained during operations in impure air conditions.





VOKES FILTERS FOR ANCILLARY EQUIPMENT

Compressors . . . portable generators . . . welding sets . . . power packs . . . all need protection against the ingress of abrasive dust, whether by air-intake, lubricating oil or fuel.

VOKES FILTERS FOR STATIONARY DIESEL ENGINE

Under abnormal conditions like these, engines have to be doubly protected and these large diesel engines are therefore fitted with Microvee dry fabric filters for cleaning the intake air. Vokes Filters are also specified for atmospheric air filtration in the ventilating systems of many of the desert buildings.

VOKES LIMITED

VOKES LTD. Head Office: GUILDFORD, SURREY, ENGLAND

London Office: 123, Victoria St., Westminster, S.W.1

Vokes (Canada) Ltd., Toronto — Vokes Australia Pty. Ltd. Sydney

V116 — ***Represented Throughout the World***

IS PIPE SUSPENSION YOUR PROBLEM?

If so, these catalogues on

PRE-ENGINEERED PIPE HANGING

will be of great assistance

Where vertical movement needs to be controlled, Vokes Genspring Variable Support Hangers give completely satisfactory results. Where uniform support is called for, throughout the travel-range of the pipe, Vokes Genspring Constant Support Hangers keep all the resulting stresses well within safe limits. These two catalogues, giving full details of each method, will enable you to select the type of suspension appropriate to your own requirements.

VOKES GENSPRING
SUSPENSION SYSTEMS

★ *Write for these illustrated booklets to Dept. 19, Vokes Genspring Limited, Guildford, Surrey.*

VIL4

ADVERTISERS' INDEX

(Advertising Agencies in Italics)

Aerofin Corporation 90
Richards & Webb, Inc.
John Allen & Sons (Oxford) Ltd. 78
Howard Bull Ltd.
Anglo-Iranian Oil Co. Ltd. 59
S. H. Benson Ltd.
Arabian American Oil Co. 3
Atlantic Refining Co. 24
N. W. Ayer & Son, Inc.
Audley Engineering Ltd. 77
Marsteller, Gebhardt & Reed, Inc.
Bell Aircraft Corporation 80
Comstock & Company
B. K. L. Alloys Ltd. 86
Sandbrook Metcalf & Co. Ltd.
Black, Sivalls & Bryson, Inc. 74
R. J. Potts-Calkins & Holden, Inc.
Buckwyn Constructions Ltd. 87
Howard Bull Ltd.
The Butterley Co. Ltd. 4
Rowlinson Broughton
California Texas Oil Co., Inc. 63
Erwin, Wasey & Co.
The Cape Asbestos Co. Ltd. 19
Taylor Advertising Ltd.
Catalytic Construction Co. 52
Doremus-Eshleman Co.
Chicago Bridge & Iron Co. 92
Russell T. Gray, Inc.
Cities Service Company 22
Albert Frank-Guenther Law, Inc.
Richard Costain Ltd. 61
Dunlop Rubber Co. Ltd. (Dunlopillo) 85
Chas. F. Higham Ltd.
E. I. du Pont de Nemours & Co., Inc. 17 & 18
Chas. L. Rumrill & Co.
Ernst Water Column & Gage Co. 90
Ethyl Corporation 7
Batten, Barton, Durstine & Osborn, Inc.
Flexible Drives (Gilmans) Ltd. 88
Boswell & Barratt Ltd.
Foster Wheeler Corporation 74a
Rickard & Company
General American Transportation Corp. 81
Weiss & Geller, Inc.
General Electric Company of England Ltd. 85
Kingscott Ltd.
Geolograph Mechanical Well Logging Co. 90
Lowe-Runkle Co.
Geophysical Service, Inc. 79
Auld Advertising
Gulf Oil Corporation 83
Young & Rubicam, Inc.
J. P. Hall & Sons Ltd. 87
Rooster Publicity Ltd.
Halliburton Oil Well Cementing Co. 26
Hill & Christopher, Inc.
Houston Technical Laboratories 9
Don L. Baxter, Inc.
International Harvester Export Co. 73
McCann-Erickson Corp.
International Paints Ltd. 62
Mayfair Adv. Ltd.
M. W. Kellogg Co. 75 & 76
Gordon Baird Associates, Inc.
Ketjen 6
Raedt en Baet
Richard Klinger Ltd. 71
S. H. Wright & Co. Ltd.
Lake & Elliot Ltd. 72
Ripley Preston & Co. Ltd.
Lane-Wells Co. Cover II
Darwin H. Clark Co.
McCullough Tool Co. 2
Raymond O. Perry Advertising
Magnet Cove Barium Corp. 20 & 21
Rives, Dyke & Co.
Mather & Platt Ltd. 14
Sidney F. Wicks Ltd.
A. P. Newall & Co. Ltd. 1
Osborne Peacock Co. Ltd.
Nordstrom Valve Div., Rockwell Mfg. Co. 77
Marsteller, Gebhardt & Reed, Inc.
Oil Center Tool Co. Cover III
Rives, Dyke & Co.
Samuel Osborn & Co. Ltd. 91
Petroleum Information 91
D. & C. & Wm. Press Ltd. 82
Taylor Advertising Ltd.
Procon, Inc. 68 & 69
Marsteller, Gebhardt & Reed, Inc.
Pye Telecommunications Ltd. 16
Arks Publicity Ltd.
The Pyrene Co. Ltd. 15
Nelson Advertising
Safe Lighting, Inc. 23
Nathan Fein Advertising
Schlumberger Well Surveying Corp. 51
Rives, Dyke & Co.
Seismograph Service Ltd. 13
Watts, Payne Advertising, Inc.
Shell Oil Company 12
J. Walter Thompson Company
Socony-Vacuum Oil Co., Inc. 8
Compton Advertising, Inc.
Peter Spence Ltd. 65
Ripley Preston & Co. Ltd.
Standard Oil Co. of New Jersey 57
McCann-Erickson Corp.
Standard-Vacuum Oil Co., Inc. 5
Sam J. Gallay Advertising
Universal Oil Products Co. 10 & 11
Marsteller, Gebhardt & Reed, Inc.
Vokes (Genspring) Ltd. 89
Crane Publicity Ltd.
Vokes Ltd. 89
Crane Publicity Ltd.
Westinghouse Electric International Co. 67
National Export Advertising Service, Inc.
Wyatt Metal & Boiler Works Cover IV
Wallace Davis & Co.
Zwicky Ltd. 84
Scottish Industrial Adv.

GLASSES & GASKETS ALL SIZES TO FIT YOUR GAGES & VALVES

MAGNIFYING

ERNST WATER COLUMN & GAGE CO.

Send for Catalog, LIVINGSTON, N.J.

Book Review

The Oil Business as I Saw It, by W. L. Connelly, University of Oklahoma Press, $3.75.

W. L. Connelly, who recently resigned as chairman of Sinclair Oil & Gas Co., has been in the oil business for 60 years from the time he borrowed $100 to drill his first oil well near Toledo. His activities have taken him to Mexico, Venezuela, Africa, Germany, Austria and Russia. During most of his active business life he was intimately associated with Harry F. Sinclair.

The account of Mr. Connelly's activities since he obtained his first oil lease in the spring of 1895 makes for particularly absorbing reading to those who have had a part in the development of the industry either in the United States or abroad.

New Otis Office

Otis Pressure Control has rebuilt and enlarged its office and service warehouse at Corpus Christi, Texas. The new offices are the first of a series of new structures which will be built on a standardized plan designed by the Austin Co. Warren K. Waters is division manager at Corpus Christi with 28 employees.

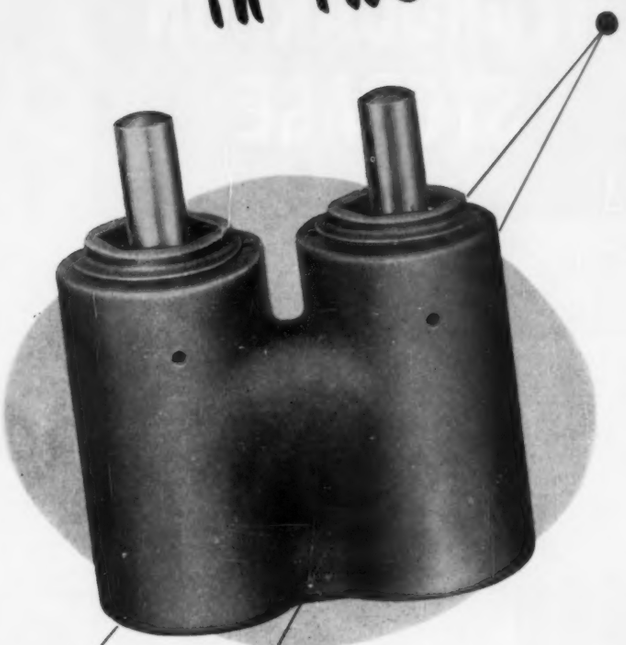
From the Arctic to the Tropics-

Geolograph's mechanical well logging unit is easily transported; is jungle-proof and desert-proof! Neither sand storm, humidity nor blazing sun affects Geolograph's accuracy in providing a foot-by-foot record which shows depth, connections and down time — at all times! That's why you always save when you log as you drill, with Geolograph!

GEOLOGRAPH
MECHANICAL WELL LOGGING SERVICE
P.O. Box 1291 • Oklahoma City 1, Okla.

Farmington, New Mex.—Liberal, Kan. Oklahoma City, Oklahoma—Abilene, Houston, Odessa, Lubbock and Wichita Falls, Texas—Bakersfield, Cal.—Shreveport and Baton Rouge, La.—Casper, Wyo.—Glendive, Mont. Sterling, Colo.—Calgary and Edmonton, Alberta, Canada—Regina, Saskatchewan, Canada

Greater strength in two ways



1 By Stronger Top Construction.

2 By Directional Solidification.

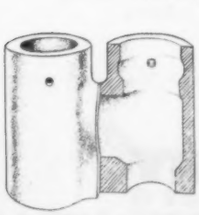
OSBORN-OHIO RETURN BENDS

TYPE 1640

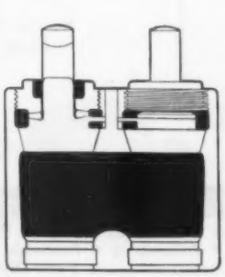
Osborn-Ohio Return Bends for Refineries and Chemical Plant, are designed to take full advantage of the principle of Directional Solidification. For the user this means castings that give better service over a longer period.

Type 1640 is recognised for its ability to withstand higher temperatures and pressure, and in common with all types of Osborn-Ohio fittings, can be depended upon to give first rate performance.

TYPE 1640



For strength at high pressure and temperatures. Detailed recommendations for particular conditions will gladly be given.



Catalogues upon request.

OSBORN

SAMUEL OSBORN & CO. LIMITED
CLYDE STEEL WORKS, SHEFFIELD

a vital formula...

PI+OI=EE

...for oil exploration

PI Information Tools* furnished by **PETROLEUM INFORMATION**

plus

OI Ingenuity furnished by **OIL INDUSTRY**

equals

EE **most EFFICIENT EXPLORATION** through Rocky Mountain states

Any company or individual interested in any degree in oil and gas activity in the Rocky Mountain West will benefit from the PI FORMULA!... Contact any PI OFFICE!

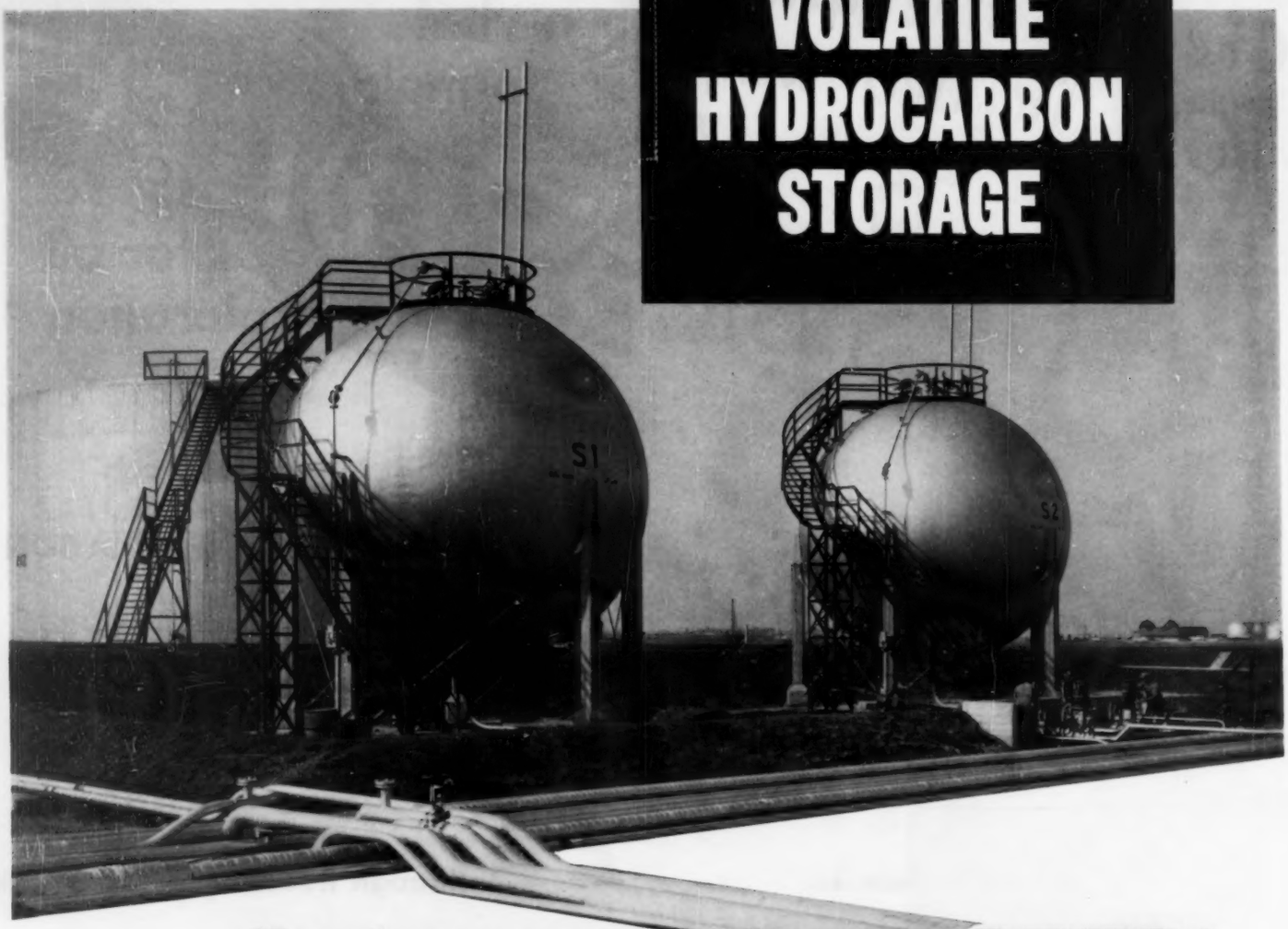
Integrated.. accurate.. complete.. information through every useful media: Reports, Pomco Ownership Maps, Oil, Gas, and Uranium Maps, Electric, Radioactive and Core Log exchanges, publications, well histories, immediately available.

Write for your complimentary copy of the special report, "Rocky Mountain Oil and Gas Industry Status Report."

PETROLEUM INFORMATION

Continental Oil Bldg.	315 No. Wolcott St.	111 No. 30th St.	214 Broadway
Denver, Colorado	Casper, Wyoming	Billings, Montana	Bismarck, No. Dakota
Phone AC 2-8506	Phone 2-3538	Phone 9-6661	Phone 3975
TWX: DN 327	TWX: CP 284	TWX: BL 12	TWX: BM 41

VOLATILE HYDROCARBON STORAGE



. . . that pays off in PROFITS!

Storing the more volatile grades of natural gasoline, butane, butane-propane mixture and refinery stocks in a Hortonsphere® pays dividends in profits. Based on the fact that no loss can take place unless vapor escapes, Hortonspheres are designed to operate at sufficient pressure to prevent practically all evaporation loss during standing storage. Contents cannot escape as long as the internal pressure does not exceed the setting of the pressure relief valves.

Hortonspheres are available in capacities up to 30,000 bbls. and for pressure to 217 lbs. per sq. in. in the smaller capacities. Complete information or quotations may be had by writing our nearest office.

WELDED STEEL PLATE STRUCTURES for the PETROLEUM INDUSTRY

- Horton Vaporspheres
- Horton Vaportanks
- Hortondome Roofs
- Flat Bottom Tanks
- Horton Floating Roofs
- Hortonspheroids
- Hemispheroids
- Hortonspheres
- Refinery Towers
- Elevator Water Tanks

CHICAGO BRIDGE & IRON COMPANY

Atlanta • Birmingham • Boston • Chicago • Cleveland • Detroit • Houston • Los Angeles • Philadelphia • Pittsburgh • Salt Lake City • San Francisco • Seattle • Tulsa
Plants: Birmingham, Chicago, Salt Lake City and Greenville, Pa., U.S.A.
Export Office — 165 Broadway Building, New York 6, N.Y., U.S.A.

REPRESENTATIVES AND LICENSEES

Ateliers et Chantiers de la Seine Maritime, Paris, France
Construction Metalliques de Provence, Arles-sur-Rhone, France
Comprimo N.V., 21, Amstel, Amsterdam (C) Netherlands
Compagnia Tecnica Industrie Petroli, Rome, Italy
Chicago Bridge & Iron Company, Ltd., Apartado 1348, Caracas, Venezuela
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Horton Steel Works Limited, Fort Erie, Ontario, Canada
W. P. Bryant, Edifico Abreu 402, Havana, Cuba
Sociedade Chibridge de Construcoes Ltda., Av. General Justo, 275, Grupo 306, Rio de Janeiro, Brazil

On Your Off-Shore Operations, *THE BEST IS NONE TOO GOOD!*

O-C-T C-19 CASING HEADS give you greater safety and dependability

than any other hanger you can buy

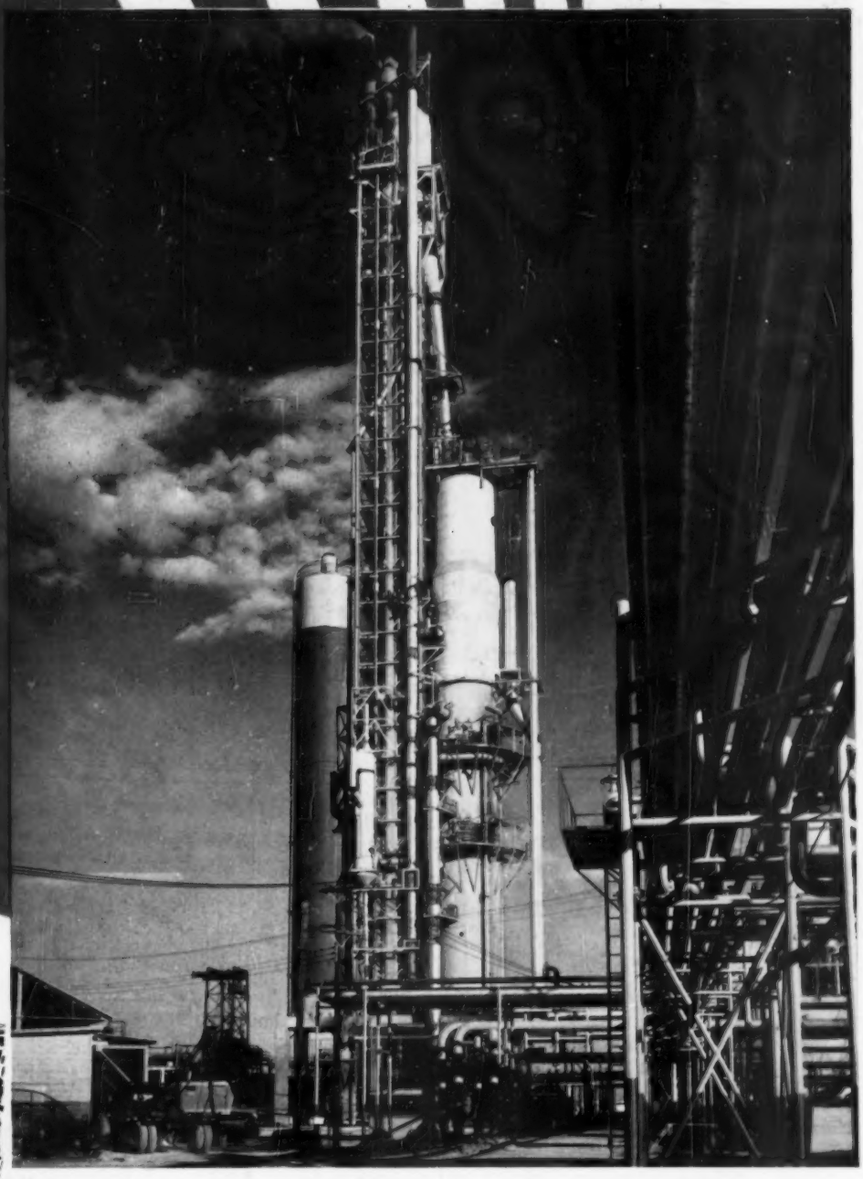
O-C-T "C-19" Casing Heads are a natural for off-shore work. They are designed for maximum safety on both land *and* off-shore wells, saving you added costs for special equipment to give you the protection you need. The "C-19", designed for quick setting and positive sealing, gives extra protection against blowouts because the well is closed in around the casing and the seal applied automatically before preventers are unflanged. Both crews and rig are protected. Enough hours of valuable rig time are saved to more than pay for the cost of the head itself. Ask your O-C-T representative or write for information.

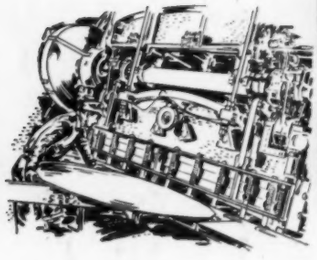
O·C·T

OIL CENTER TOOL COMPANY

Export Representatives: Sterling Areas — Le Grand, Sutcliff & Gell, Ltd., Rochester, Kent, England. Address Export Inquiries for All Other Countries to P. O. Box 3091, Houston, Texas.

THERE IS ALWAYS TOMORROW





• Whenever research comes up
with one process accomplishment,
it has opened the doors
to another score of possibilities.
For that reason Wyatt's facilities,
along with being adequate for today,
are always ready for tomorrow.

Wyatt's
HOUSTON-DALLAS-NEW YORK-TULSA

MANUFACTURERS AND ERECTORS SINCE 1913